

ENVIRONMENTAL STUDIES

A Textbook for Class III

PART II

Learning Science through the Environment



National Council of Educational Research and Training

First Edition

May 1979

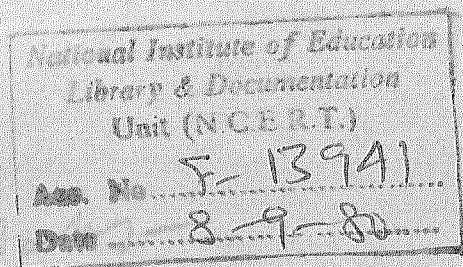
Vaisakha 1901

Reprinted

March 1980

Chaitra 1902

P. D. 45 T



© National Council of Educational Research and Training, 1979.

TEXTBOOK COMMITTEE

Shri G. Guru

Shri H. L. Sharma

Km. Shukla Majumdar

Cover Transparency : C.P. TANDAN

Rs. 1.55

Published at the Publication Department by V. K. Pandit, Secretary, National Council of Educational Research and Training, Sri Aurobindo Marg, New Delhi 110016 and printed at Indian Printing Works, Jhandewalan, Rani Jhansi Road, New Delhi 110055

FOREWORD

The report of the Review Committee 1977 on the Curriculum for the Ten-Year School has recommended that in classes III-IV/V there should be one textbook for language, one book for mathematics and one for Environmental Studies. It is envisaged that in the primary classes science and social sciences should be taught as Environmental Studies. The courses in Environmental Studies should include both the natural and social environment. The purpose is not to stuff the minds of children with facts and information, but to sharpen their senses, to enable them to observe their environment and to enrich their experiences. The present book on Environmental Studies for class III is based on the two earlier books, namely, *We and our Country* and *Learning Science through the Environment*, which are based on the curriculum developed by the National Council of Educational Research and Training for Environmental Studies (Part I and Part II) for classes III to V.

Part I of this book deals with the area of social studies and has been prepared keeping in view the special needs of the Central Schools in the country. As these schools are scattered all over the country the study of the home State becomes somewhat irrelevant for these schools. As such, the first part of this book tries to provide a bird's-eye view of life in different parts of our country. Also, students have been introduced to the times of early man when he began to use fire, cultivate crops and invent the wheel. A few more lessons in this part deal with civic amenities like education and health services, and services rendered by Gram Panchayats and Municipalities.

Part II of the book deals with the natural environment of children. The contents of this part reflect the philosophy that science education at the primary stage should be based not on the principles of science as the focal point, but with a view to having an understanding of the environment and its problems through a scientific method as the main goal. The chapter headings in this part of the book reflect the elements in the environment on which learning is based.

It is hoped that this shift in emphasis in the study of natural environment will make it possible to relate scientific knowledge to the real life of the pupils. Emphasis has been given to pupils' participation in the learning resource. Simple science processes of observation, measurement, classification and communication can be developed through these activities.

In this edition, necessary deletions and replacement of illustrations have been carried out in Part II of this book as suggested and recommended by the Subject Committee of the Review Committee.

In view of the special needs of the Central Schools where students in this class study science through the English medium and social studies through the Hindi medium, Part I and Part II have been brought out separately.

The Council is thankful to Kendriya Vidhyalaya Sangathan, Department of Education Delhi Administration, Delhi Municipal Corporation and New Delhi Municipal Committee for their kind cooperation in deputing their representatives who worked in a week-long workshop where the first part of this book was planned and the first drafts of some of the chapters written and discussed in great detail. I am thankful to my colleagues in the Department of Education, Social Sciences and Humanities who, working as a team, have been able to develop Part I of this book under the general guidance and supervision of Professor B. S. Parakh.

The Council is also indebted to several persons for writing and reviewing the text of Part II of this books. The writing team consisted of Shri G. Guru, Shri H. L. Sharma, and Kumari Shukla Majumdar. The review work was done by Kumari Shukla Majumdar. The Council is also grateful to Dr. B. D. Atreya for his help in bringing out this book in its present form.

Curriculum development is an on-going process and as such every suggestion towards the improvement of the present curriculum and textbook would be most welcome. We would like to give due consideration to all such suggestions in the revised version of this edition.

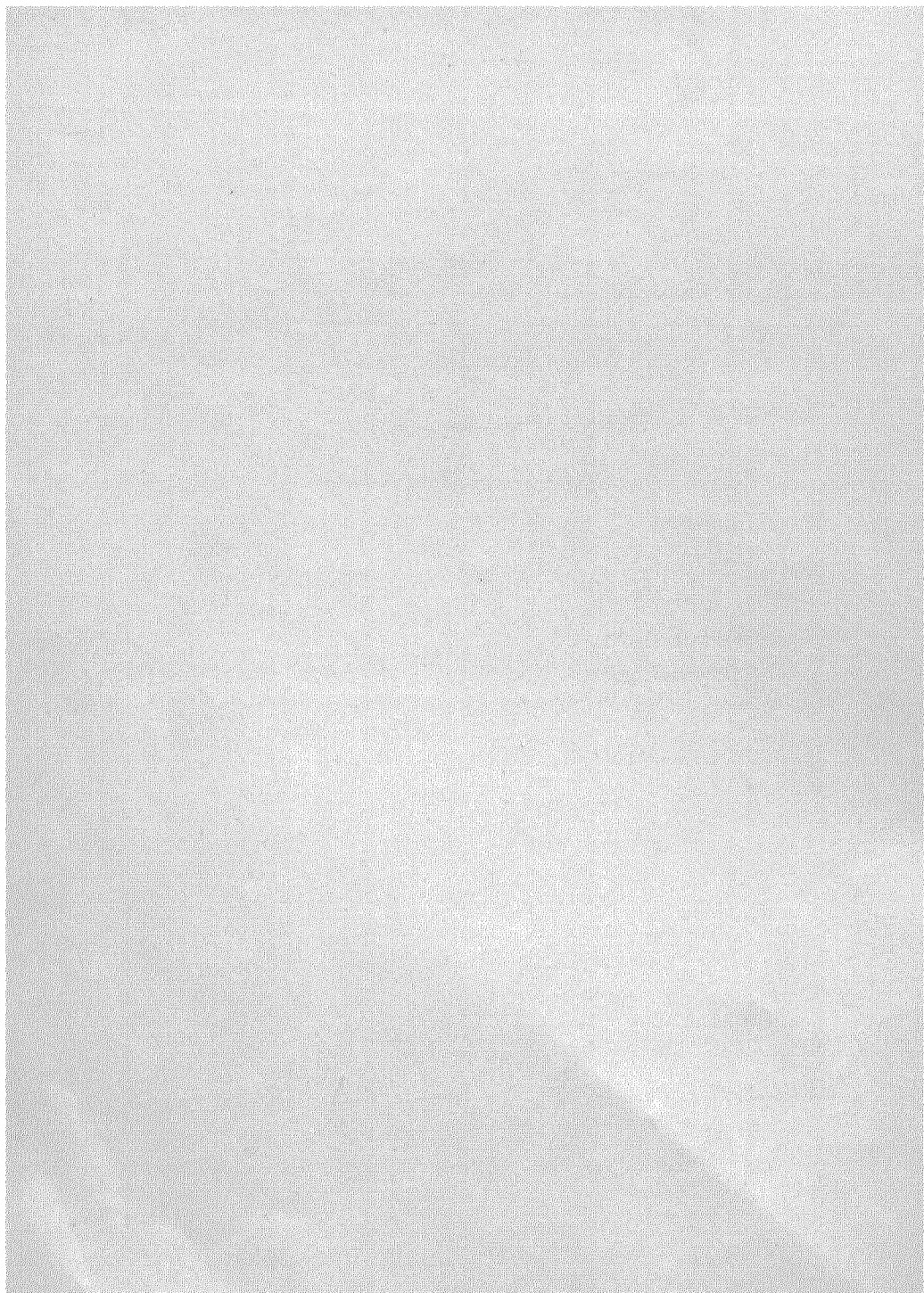
S. L. B. K. M. TRA
Director

National Council of Educational
Research and Training

New Delhi
December 1978

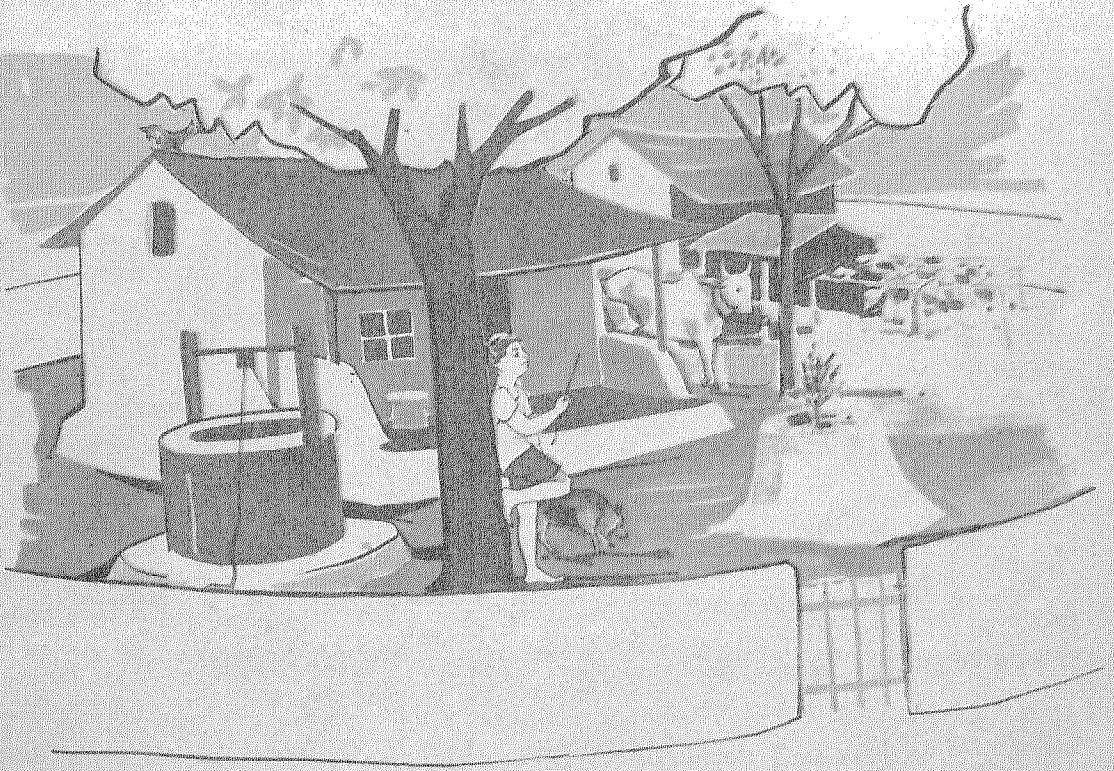
Contents

1	PLANTS AND ANIMALS AROUND US	..	1
2	OUR BODY, FOOD AND HEALTH	..	13
3	SOIL AND CROPS	..	25
4	WEATHER	..	30
5	MATERIALS AROUND US	..	37
6	HOUSING AND CLOTHING	..	43
7	WHAT MAKES THINGS MOVE	..	50
8	THE EARTH AND THE SKY	..	58



CHAPTER 1

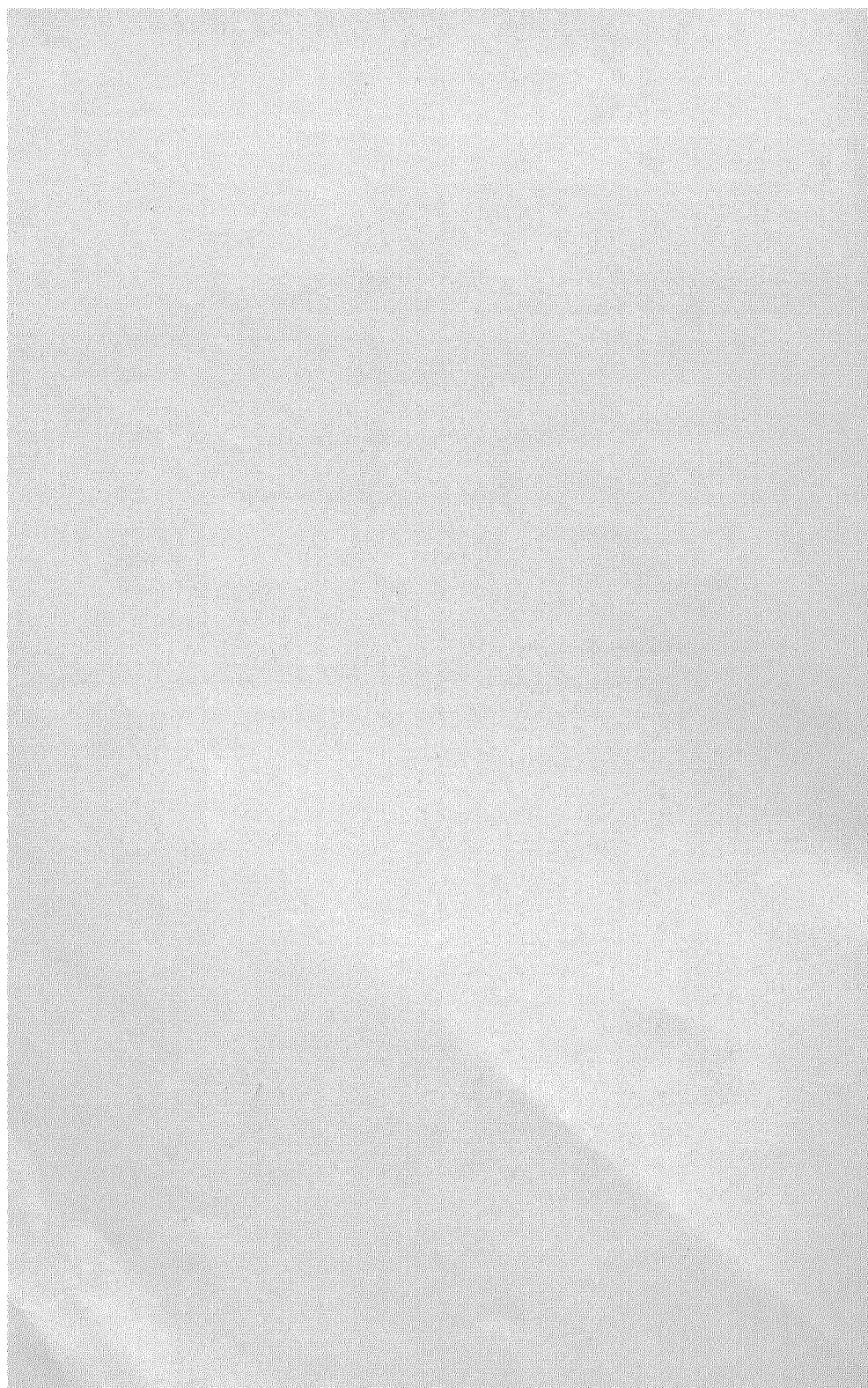
Plants and Animals Around Us



LOOK around. You will find a variety of things. Some of them you may find in the above picture. Write down their names. Can you add to the list?

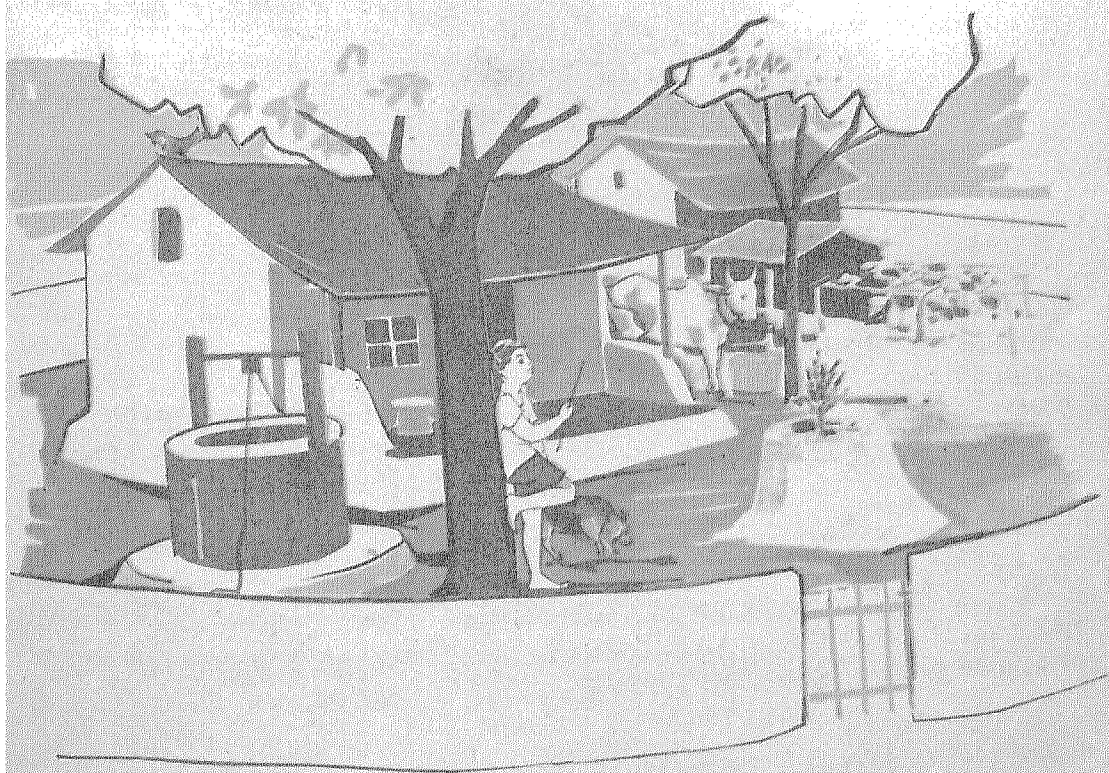
These things look so different from each other. But do they have something in common? From your list you will find that insects, dogs, cows have something in common. They are called animals. Similarly, a mango tree, a rose plant and a *neem* tree have something in common. They are called plants.

Both plants and animals have many things in common. They grow in size. They multiply. Can you make a list of some other common features? But plants and animals differ in many ways. Let us first learn about plants.



CHAPTER 1

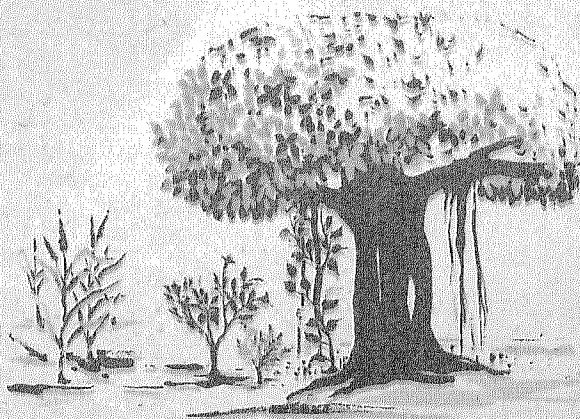
Plants and Animals Around Us



Look around. You will find a variety of things. Some of them you may find in the above picture. Write down their names. Can you add to the list?

These things look so different from each other. But do they have something in common? From your list you will find that insects, dogs, cows have something in common. They are called animals. Similarly, a mango tree, a rose plant and a *neem* tree have something in common. They are called plants.

Both plants and animals have many things in common. They grow in size. They multiply. Can you make a list of some other common features? But plants and animals differ in many ways. Let us first learn about plants.



Look at the plants around you. Some are big. Some are small. Some stand straight. Others grow on supports. Some spread on the ground. They look so different. Yet they have certain features in common. What are those?

Let us find out

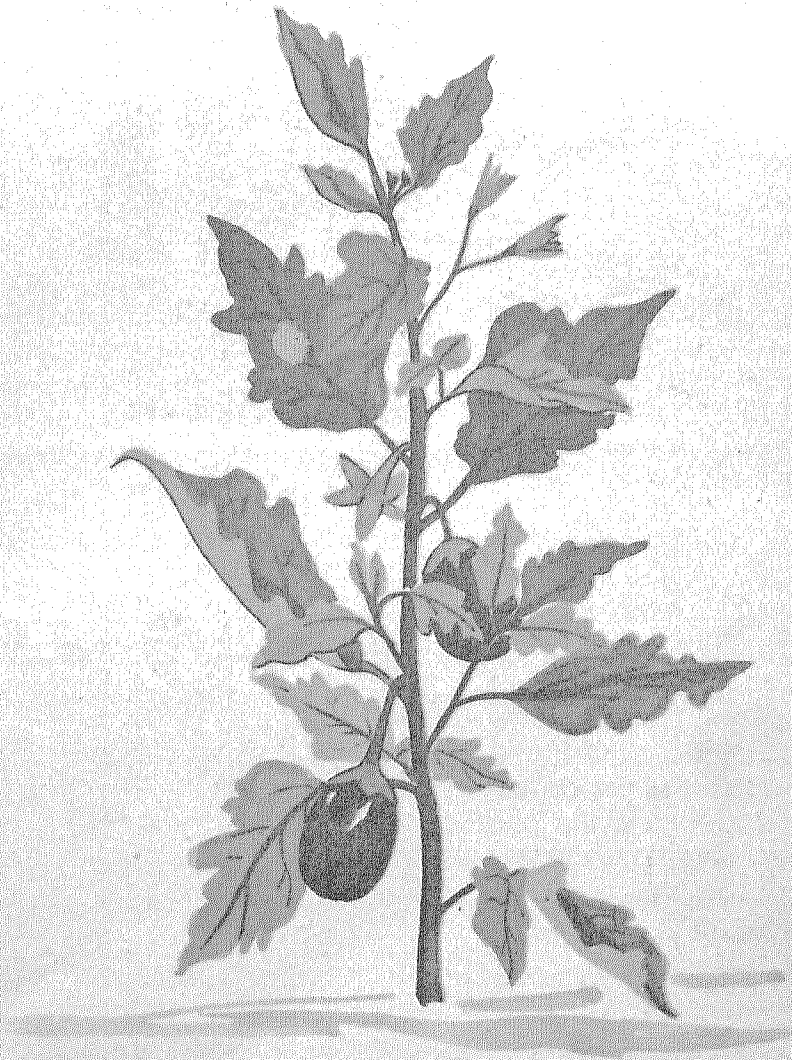
Go out to the school garden or a farm. Look carefully at any small plant like bean, brinjal, tomato, or *bhindi*. They all grow in the soil. Examine the part that grows above the soil. Each plant has a long green or brown part. This is the stem.

A number of branches come out of the stem. Find out different things on the branches. The flat green things are leaves. Do you find any white or coloured structures? These are flowers. In some plants you may also see fruits. Cut a fruit. See the inside. There are seeds. Do you know that fruits contain seeds? Do you know the functions of seeds?

All these parts grow above the soil. Is some part of the plant inside the soil? Try to pull one of the plants. Does it come out easily? It seems something is holding it to the soil. What holds the plant to the soil?

Let us find out

Carefully dig out a plant. Do you see soil sticking to it? Gently remove the soil. Examine the part. How is it different from the stem? Is it branched? What is its colour? Do you know the name of this part? Do all plants have roots?



Let us learn more

Observe carefully some big plants like a mango tree, a *jamun* tree or a *neem* tree. Also observe some small plants like mustard, *arhar*, rose, wheat, paddy, Bengal gram (*chana*), brinjal, pea, bean, etc. Note down your observations. Record the height of the plants, the number of branches, the shape of leaves and the kind of flowers and fruits. Can you draw such leaves, flowers and fruits?



Seeds grow into new plants. Have you seen a new plant growing from a seed?

Let us see

Take a pot. Fill it up with the garden soil. Sow some seeds of gram, bean, maize, wheat or any other seed. Keep the soil wet. Observe the pot every day. What comes out of the soil first? When does the first leaf appear? What other things are there besides leaves? Observe every day. Record all your observations for seven days.



The seeds of bean give rise to only the bean plant and the pea seed to the pea plant. We never get a pea plant from a bean seed, or a bean plant from a pea seed.

Different methods are used to grow new plants. What are those methods?

Let us find out

Watch a farmer sowing *bajra* or wheat grains. The farmer prepares the field by ploughing and tilling. When the field is ready, the grains are sown. Soon seedlings come out. These are new plants. When they



become big plants then flowers appear. Flowers give rise to grains. When the grains are ripe, the farmer collects the grain from the field.

Is there any other way of growing plants from seeds?

Let us find out

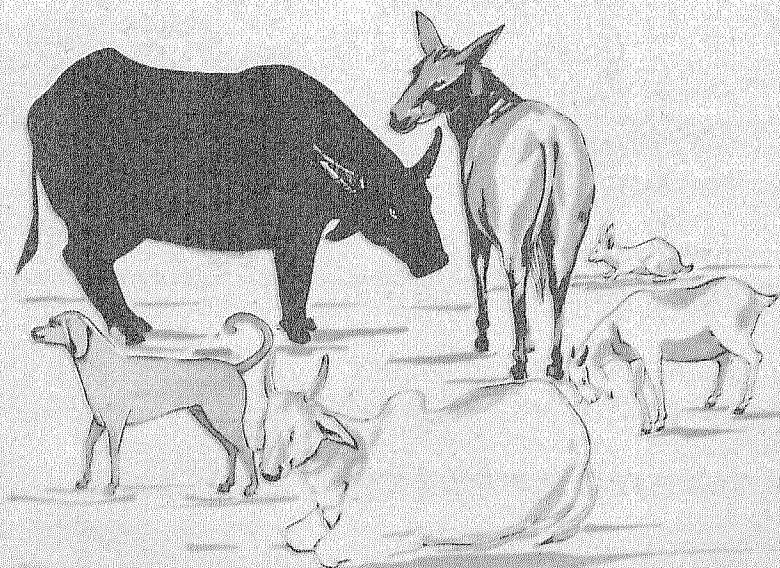
Visit a nursery. Observe how the nursery beds are prepared. Find out which plants are grown in the nursery bed. Observe how the plants are transplanted from the nursery beds to the garden beds. When the seedlings are taken out from the nursery bed and planted in the garden, it is called transplantation.

You can also prepare your own nursery bed. Your teacher will help you. Take a pot. Fill it up with garden soil. Sow seeds of tomato or brinjal. Water it regularly. Let the seedlings grow till they are 15 cms tall. Now take out the seedlings. Plant the seedlings in other pots or in the garden. Observe how they grow.

Many varieties of paddy are grown by transplanting. Make a list of other plants which are grown by transplanting.

We grow many plants for our use. We also keep animals for our use. A farmer uses bulls for ploughing the field. Cows and buffaloes are kept for milk. We also keep some animals as pets. Can you name some of them?

There are also many wild animals like the lion, the tiger and the jackal.

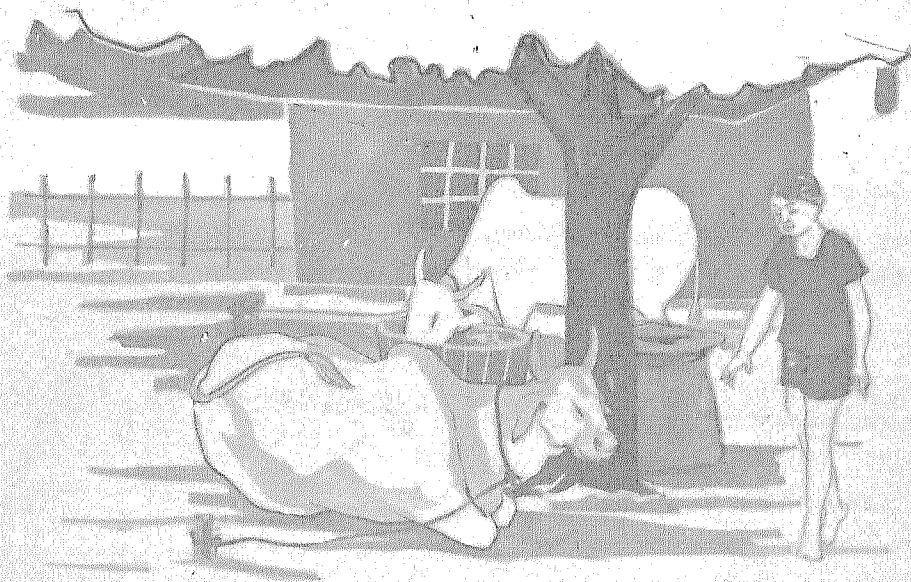


The picture shows some common animals. Can you name some of them? What do these animals eat?

Let us find out

Visit a farm or cattleshed. Find out the food of the cattle. Observe how they eat. They seem to eat very fast. They hardly chew the food. Watch those which have finished eating. Observe them carefully. What do they do after eating? Do you know what they are chewing? Of course, the food.

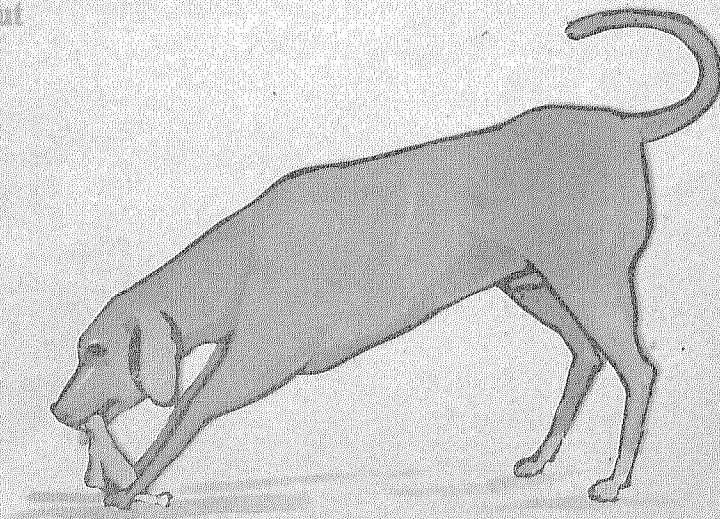
The food is first swallowed without chewing properly. Later, the half-chewed food is brought back to the mouth. It is then chewed again.



This is called 'chewing the cud'. Buffaloes, cows, goats chew the cud. Do horses and donkeys also chew the cud?

Cows, buffaloes, donkeys, horses and goats eat plants. They have teeth for cutting and chewing. Do all animals eat plants?

Let us find out



Some animals eat flesh. The cat, the dog, the tiger and the lion eat flesh.

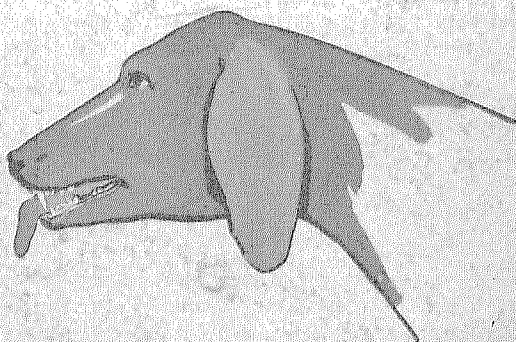
Watch a dog tearing flesh from a bone. What is it that helps the dog tear the flesh? Look carefully. You will see its tearing teeth. These teeth are long, sharp and pointed. Can you name some other animals that eat flesh?

Animals eat in many other ways.

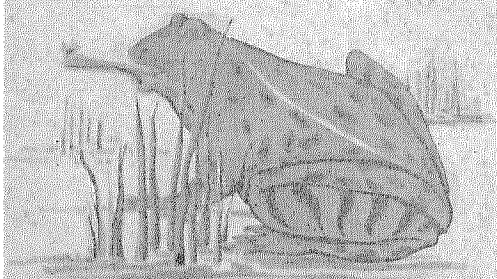
Some animals swallow food without chewing. Which are these animals?

Let us discuss

Have you seen a house lizard?
Observe how it catches an insect.
Observe how it swallows the insect.
Do you know that lizards have no teeth for chewing?



Like a lizard a frog also swallows its food. The picture shows a frog catching its prey.



All animals do not eat solid food. The butterfly, the honey-bee, the housefly and the mosquito live on liquid food. They have no teeth.

Have you seen butterflies on a flower?
They suck the sweet juice from the flower.
This juice is called nectar. Find out the food of the mosquito, the honey-bee and the housefly.

Do you know about the food of common animals of your locality?
What are their ways of eating?

Let us find out

Make a list of the animals that you see in your



locality. Find out about their food. Do they have special ways of eating? Record your observations in the table below:

<i>Name of the Animal</i>	<i>Its Food</i>	<i>Special Way of Eating</i>
1. Birds: Sparrow Parrot Hen Duck Mynah Vulture Crow		
2. Animals: Cow Horse Squirrel Rat		
3. Insects: Cockroach Ants Grass-hopper Caterpillar Bed bug Bed bug		

You can add to this list. Group these animals. You can put animals with similar eating habits in one group.

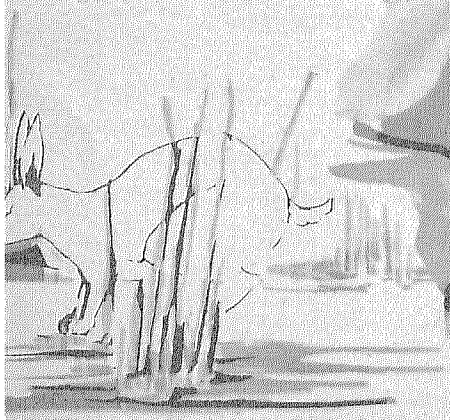
We all need shelter. We build houses to live in. We also build shelters for domestic animals. Where do other animals live? Do they make their own homes? Animals make their homes in different places.

Given below are pictures of some animals and their homes.

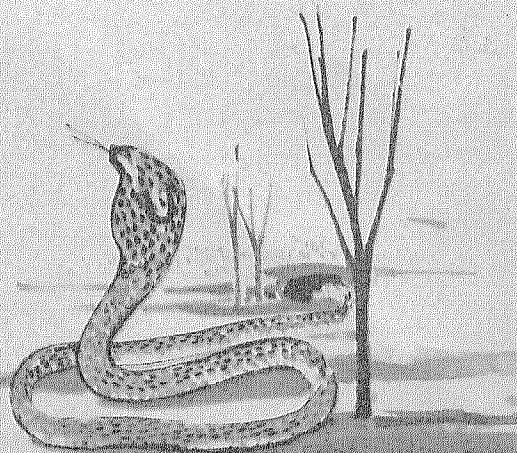
A lion lives in a den.



A rabbit lives in a burrow.



A snake lives in a hole.



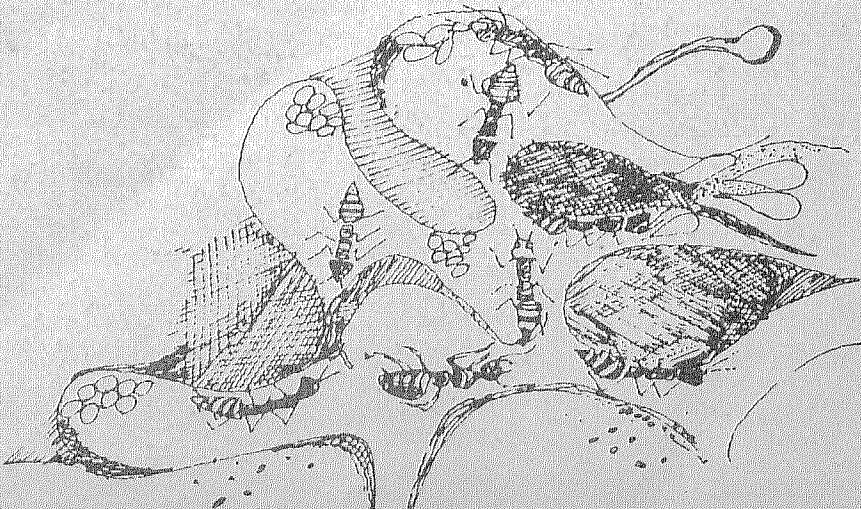


Bees lives in a beehive.



Ants live in an ant hill.

Some animals like to live in a family. Some other animals live in a large pack. Some insects live in special colonies. The beehive is a colony of honey-bees. In a beehive, members have different work. There are worker bees, a queen and drones. Try to find out more about the life of bees. Some animals, like the field mouse, dig holes in the ground. Find out other animals that dig their own holes. Some animals, like the snake, live in holes dug by others. Observe an ant-hill. Here is a picture of an ant-hill.



Find out about the life of ants. How do they live together? How do they work together?

Let us learn more

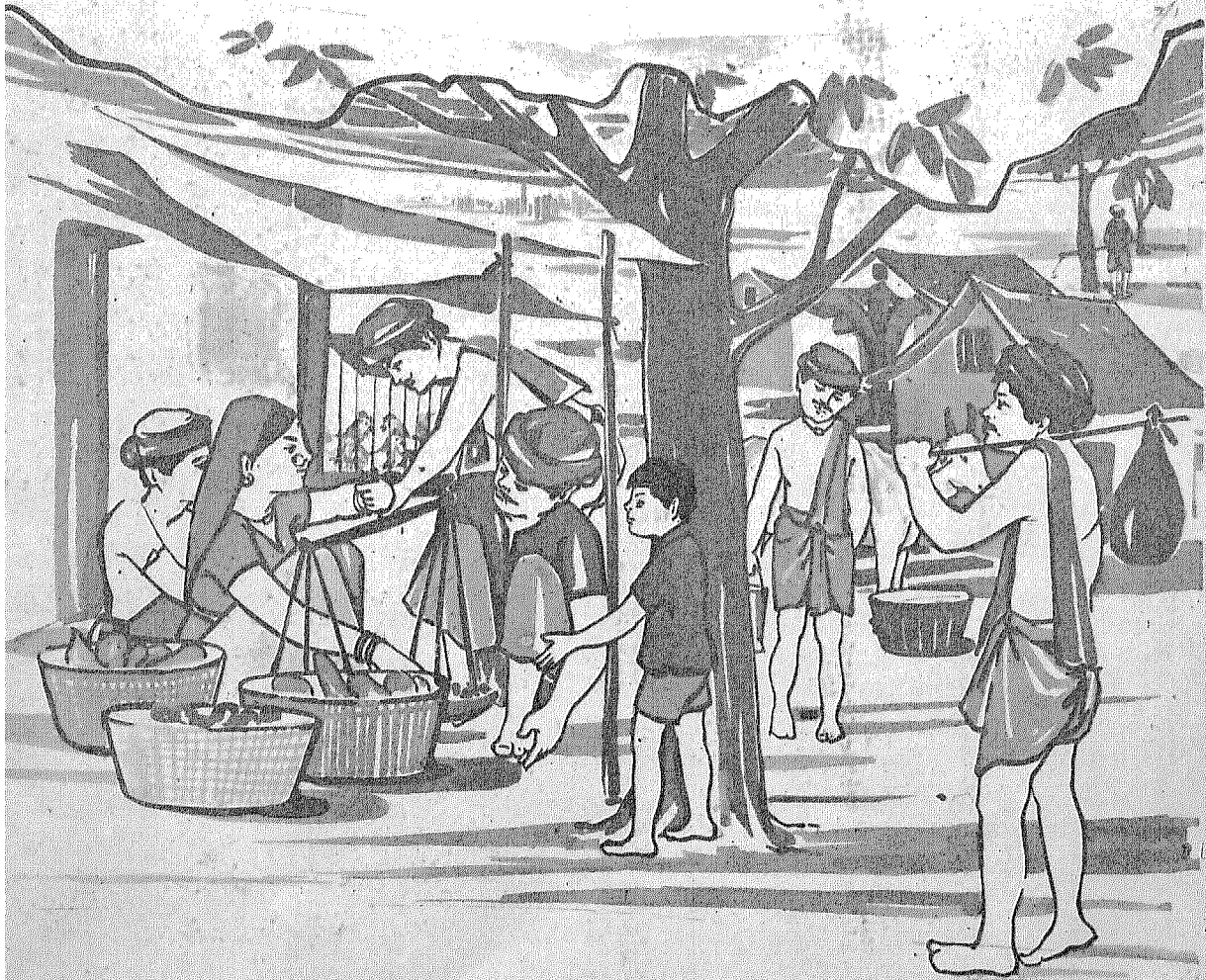
Find out which animals live in your house. Which ones dig holes? Which ones make nests? Which ones come out only at night? What do these animals eat? (Animals around your house may be house lizards, cockroaches, mosquitoes, mice, earthworms, sparrows, crickets, ants, etc.)

Things to do

1. Examine the roots of wheat, grass, lady's finger (*bhindi*), bean, tomato, and brinjal. Find out if they have similar roots, stems, flowers, and fruits. Draw these plants in your note-book. Record all your observations.
2. Visit the different vegetable fields in your locality. Make a list of the vegetables grown in the locality. Which of these are grown by transplanting?
3. Make a list of flowering trees in your locality. Note the time of their flowering. Find out the uses of these trees.
4. Collect empty nests of birds. Examine these nests. Find out the different materials used for building these nests. Make drawings of some of these nests.

CHAPTER 2

Our Body, Food and Health



You need food every day. Why do you need food? From where do you get food?

Let us find out

Every day you study, play and do different sorts of work. You get tired after play and work. Why do you feel tired? Because you have very little energy left. When you are hungry, do you want to play? Do you like to do any work? No. Why? Because you do not have enough energy. You do not feel like doing any work.



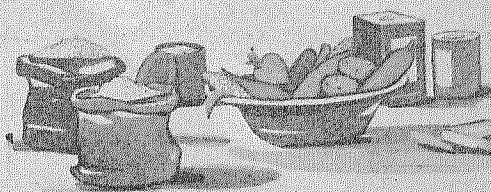
After taking food you do not feel hungry. You get back your energy. Food gives you energy to work, study and play. Food also helps you to grow strong and big. It also helps you to keep well and cheerful.

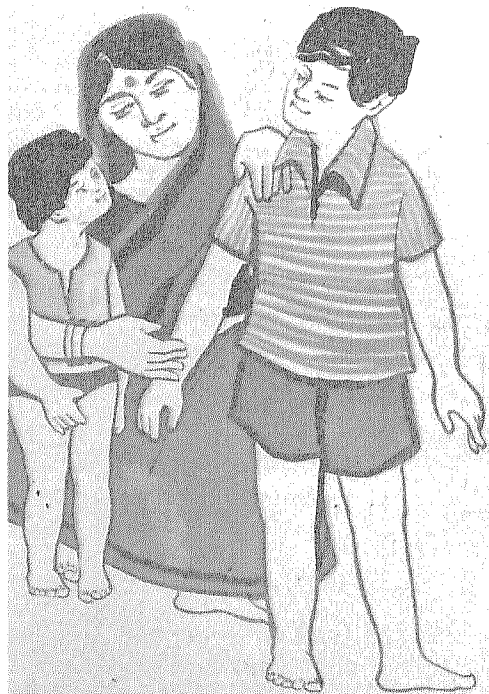
You take different food every day. Can you name some food items? Here are some: wheat, rice, *bajra*, maize, *jawar*, green gram (*mung*), red gram (*arhar*), black gram (*urad*), pea, bean, ground-nut, potato, sweet potato, tapioca, yam, carrot, cabbage, *methi*, *palak*, *sajana*, brinjal, tomato, lady's finger, pumpkin, banana, guava, apple, mango, papaya, orange, lemon, sugar, oil, milk, curd, ghee, fish, meat and egg.

Which food items give you energy? Which food items help you to grow big? What keeps you well?

Let us discuss

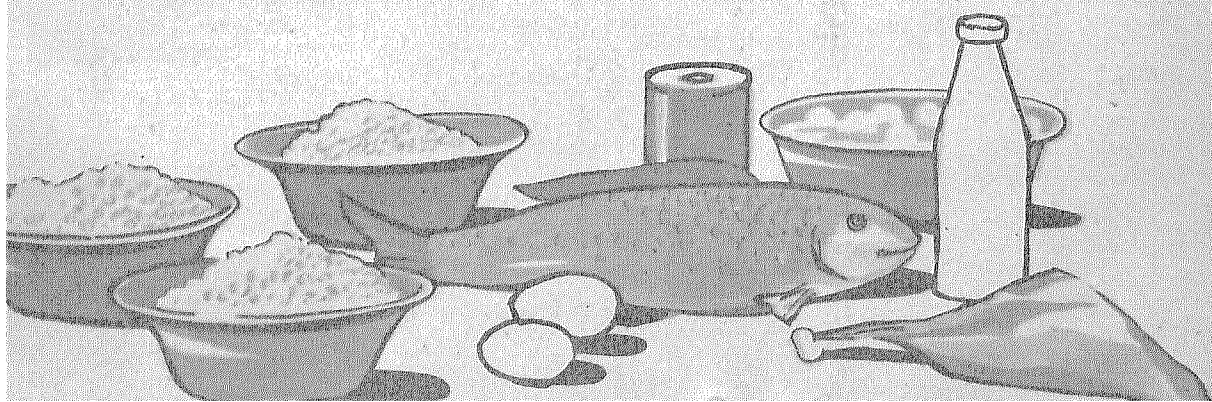
The energy-giving food includes sugar and jaggery (*gur*), cereals, starchy vegetables and fats and oils. Cereals include wheat, rice, maize, *bajra* and *jawar*. Potato, sweet potato, tapioca and yam are starchy food. Fats and oils include ghee, butter and all cooking-oils. Oil seeds and nuts are also rich in oils.

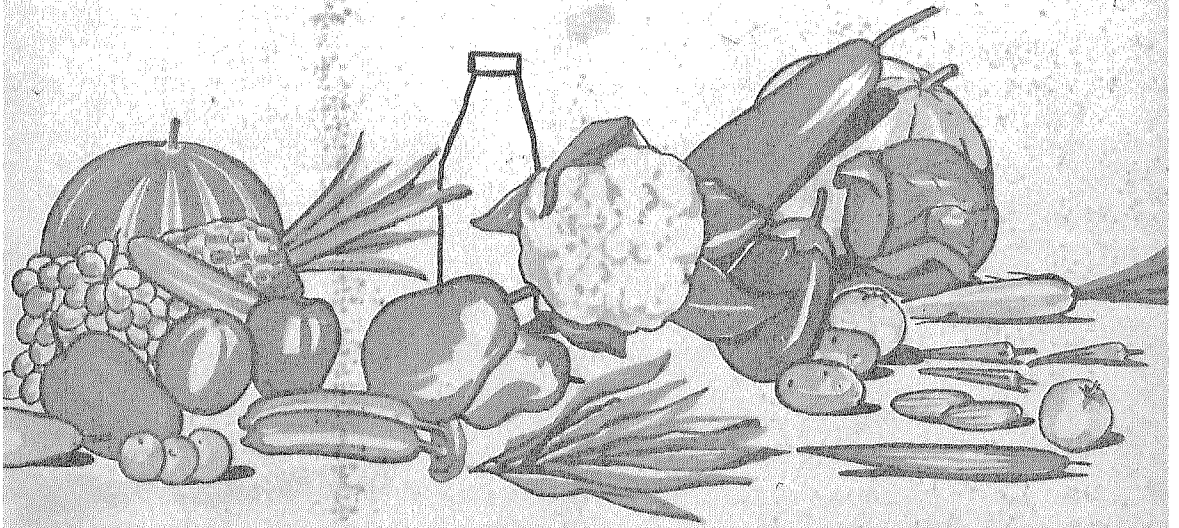




The food that helps you to grow big and strong consists of pulses, nuts, milk, milk preparations, egg, meat and fish. This type of food contains special substances which help in building your body. These substances are called proteins.

The food that helps you to keep well contains special substances called vitamins and minerals. Some food items have more vitamins and minerals. These are green leafy vegetables, other vegetables, fruit, milk, milk preparations and fleshy food.





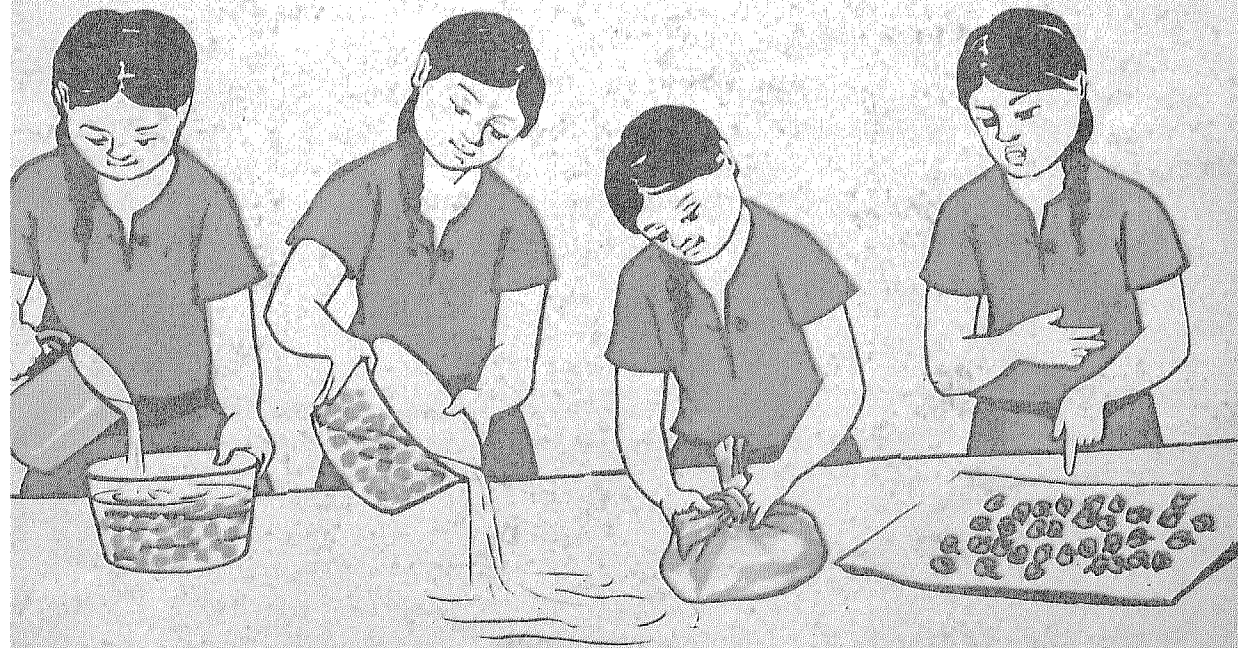
Make a list of the food you eat every day. Which food is energy-giving? Which one helps you to grow? Which one keeps you well and cheerful? Note them in the table below.

<i>The food which gives you energy</i>	<i>The food which helps you to grow</i>	<i>The food which keeps you well</i>

Does your list contain food from each group? If not, what will you do? Your daily food should give you energy, help you to grow and keep you well. Make a habit to eat food from each group every day. You should also take plenty of water. It is also useful for the body. Your mother

gives you cooked food to eat. But you must have taken some food which is not cooked. Can you name some such items? Here are a few: cucumber, carrot, tomato, beet-root, cabbage, and all types of fruit. These food items give you more vitamins and minerals. Vitamins help you to keep well, cheerful and healthy. Cereals and pulses can also be eaten without cooking. You may ask how? By sprouting. Sprouting increases the vitamin content of food. How does sprouting occur?

Let us find out



Take a small bowl. Put a handful of Bengal gram (*chana*) in it. Wash it well. Leave it soaked in water for about eight or ten hours. Drain off the water. Put the soaked grains in a piece of cloth. Tie it loosely. Keep it in a warm place. After ten to sixteen hours the grain will sprout. That is, the seeds become larger and a small white thing comes out of each seed. Do you know what it is?

You can sprout other cereals and pulses in the same way. Wheat, maize, *bajra*, *jawar*, black gram, red gram and green gram can be eaten like this. You should eat some uncooked (raw) food daily. You should develop a taste for sprouted grains. They should be taken without salt or sugar.

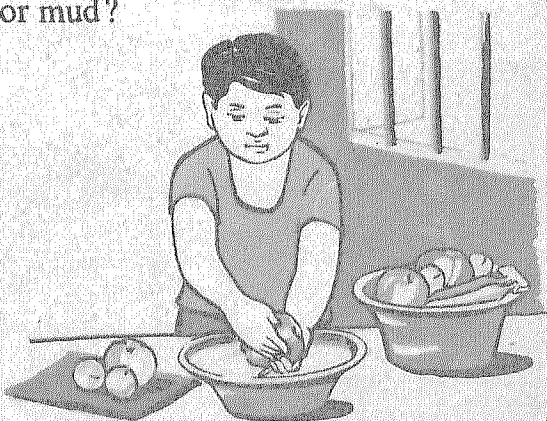
Fruits and vegetables should be washed before eating. Do you know why?

Let us find out

Collect some seasonal fruits and vegetables. They may be carrot, radish, mango, guava, papaya. Examine them carefully. Are they clean? Do you find any dirty spots? Is there dust or mud?

They may be looking clean. But there may be invisible harmful things or fine dust particles. Wash them in a bowl of clean water. Does the water turn dirty?

Dust, dirt and flies spoil food. Spoiled food should not be eaten. It will make you ill. All food stuffs should be washed well in clean water before cooking or eating. Washed and cleaned food should be kept covered. Clean fresh fruit should be eaten immediately after cutting. It should not be left open for long. Why? Cut fruit, if left for long, loses some vitamins. Dust carried by the wind and germs carried by flies also spoil the cut fruit.



Make a survey of five families. Prepare a list of the food items that they take every day. Record your observations in the table below:

Food Items	Families				
	I	II	III	IV	V
<i>Energy-rich food</i>					
Cereals					
Starchy food					
Fats and oils					
Sugar and jaggery					
<i>Protein-rich food</i>					
Pulses and nuts					
Milk, fish, egg, meat					
<i>Protective food</i>					
Green leafy vegetables					
Fruits					
Other vegetables					
Sprouted grains					

Does any family lack food that builds the body, food that gives energy and food that keeps one well? We need enough food to be active, strong, well, smart and cheerful. To remain always active, we need enough energy-giving food every day. To grow and become strong we need enough protein-rich food. To keep ourselves well, smart and cheerful we need enough vegetables and fruits.

Are all of us active, strong, smart, cheerful? If not, what does that mean? Perhaps the cause is lack of proper food in right amounts

How can we get more food? By producing more. We all can take part in the production of food. How?

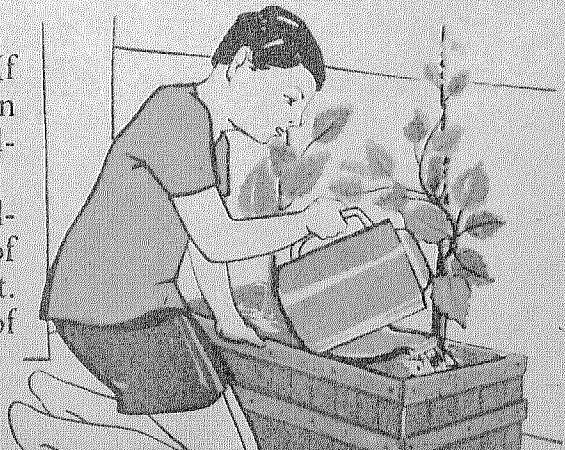
Let us find out

Do you have any spare plot of land in your home? You can use it to develop a kitchen garden. It is a good hobby for your leisure. It is also useful. Prepare the plot. Sow seeds of seasonal vegetables like *bhindi*, *methi*, *palak* and tomato or some seeds of plants you want to grow. You can also collect saplings. Water the plants. You can use waste water from your kitchen. Treat the plants gently and with care.

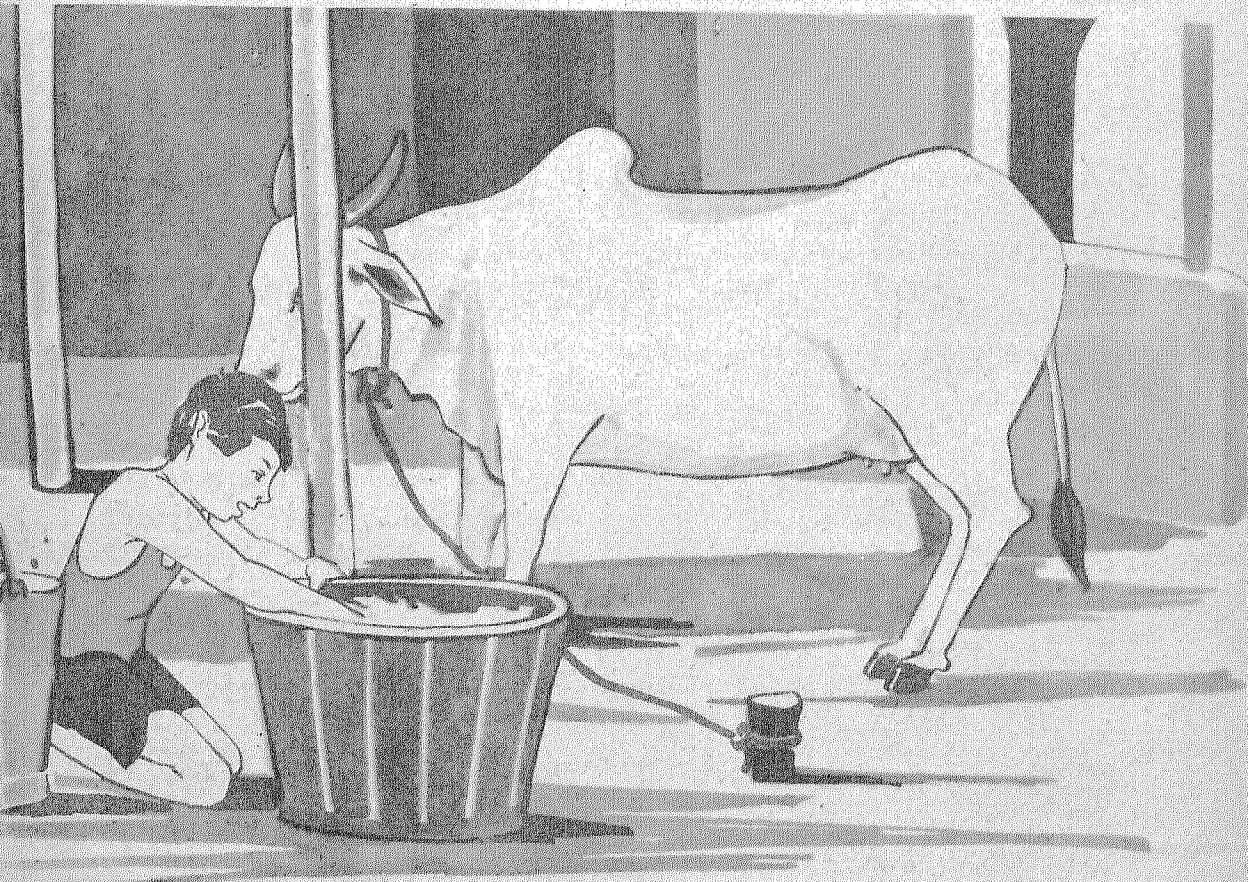
You can easily get fresh green vegetables, other vegetables and

fruits from your kitchen garden. If you have no spare plot, you can raise plants in pots and in cardboard boxes.

When the vegetables are ready, collect them. Find out how much of vegetable you got from your plot. Compare your produce with that of your friend.



In what other ways can we produce more food? Milk is a wholesome food. How can we get more milk? By taking proper care of cows,



buffaloes, goats and camels. Help your parents to take proper care of these animals. See that they get proper and adequate food and clean drinking-water. Keep the place clean.

Eggs, meat and fish are important food items. How can we produce more of these items? More eggs can be produced by keeping poultry. Pigs also can be raised to get ham, bacon and pork. Fish can be cultured in fish tanks to get more fish.

You need good food and enough food. Take food in small bits. The food is then crushed in your mouth. If you do not crush the food it will not get digested. Your teeth help to crush the food by chewing. Unless we have good teeth to chew food, we cannot become healthy.

Why are good teeth necessary for health?

Let us find out



Wash your hands and mouth. Take any clean food available. It may be raw cucumber, carrot, radish, sweet potato or *amla*. You may take fried gram, or groundnut. As you put the food into your mouth, your teeth break it into smaller pieces. The food is then swallowed. Imagine what it would be like if you had no teeth! In what other ways do teeth help us?

Let us find out

Try to speak without letting your tongue touch your teeth. Can you speak properly? Do you find it difficult to say some words? What are these words? Write them down. You find that teeth help you to speak properly. They also give shape to your face. See the two pictures of the same man. One is with teeth and the other is without teeth. See how different the two faces look.

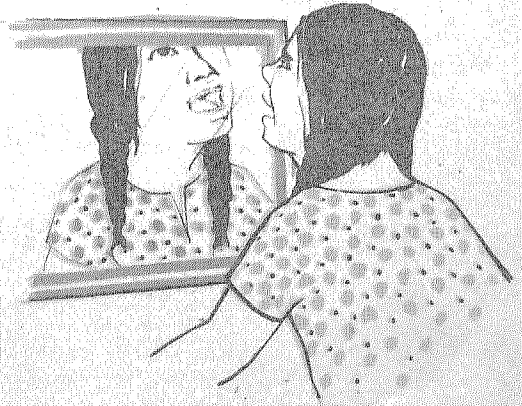
Are all your teeth of the same size and shape?



Let us find out

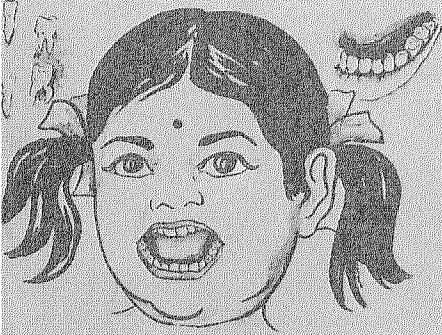
Look at your teeth in a mirror. Do they look alike? Are they of diffe-

rent shapes? You will find that some teeth are pointed and long. Some are flat. Do different kinds of teeth have different types of work to do? Observe closely when you take your food. Can you tell what work each kind of tooth does? Which ones cut the food? Which ones tear it? Which ones grind it? Look at the picture. See the different kinds of teeth. There are cutting teeth, tearing teeth and grinding teeth. How many teeth of each kind do you have?



Let us find out

Look at the mirror. Count the teeth. How many teeth are there in the lower jaw? How many are there in the upper jaw? Did you always have teeth in your mouth? How can you tell? Look inside the mouth of your baby sister or brother. Do you see any teeth? For the first few months a baby has no teeth. When the baby is 6 to 7 months old, teeth begin to appear. These are called 'milk' teeth.



As you grow up, you begin to lose your 'milk' teeth. New teeth grow in the place of the ones you have lost. The new teeth are called permanent teeth. Perhaps you and some of your classmates have already lost some of your first teeth and got some new teeth. Make a survey of your class and find out. Write the findings in the table given below.

<i>Name of your classmate</i>	<i>Number of milk teeth lost</i>	<i>Number of permanent teeth</i>	<i>Total Number of teeth present</i>
1.			
2.			
3.			
4.			

If you lose your permanent set of teeth, you will not get any more. So you should take good care of them. Keep them clean and sparkling. What is the proper way of cleaning teeth?

Let us find out

Take a *datun*. It may be a *neem* or *babul* stick. Chew one end of the stick until it is soft. Clean your teeth with this brush. Another way of



cleaning your teeth is to use a tooth-brush. How to brush the teeth? See the picture. Brush with up and down movements. Take care to remove the particles of food from between your teeth. Massage your gums with clean fingers. This will keep the gums healthy. The gums will keep the teeth firm. Brush your teeth every morning. You should clean your teeth before and after taking food. You should also clean

your teeth before going to bed. What happens if you do not take proper care of your teeth?

Let us find out

Look at the picture. You will see what happens if you do not clean your

teeth properly. The food particles will remain between the teeth. These food particles will decay. Bad smell will come out of your mouth. Germs will grow and spoil the teeth. If the teeth are spoiled, food cannot be chewed properly. It is not broken into small pieces. This leads to indigestion and stomach trouble. If the teeth are not taken care of properly, you will get diseases of the gums. The gums may become soft and swollen. The teeth will loosen. Cavities may be formed in the teeth.



Your teeth will ache and become very painful. There will be foul smell

in your mouth. You may have to go to the dentist to have the bad teeth removed.

Drumstick, sugarcane, raw carrot or radish give good exercise to your teeth and keep them healthy. Eat some fruit or raw vegetables at least once a day.

Things to do

1. Prepare a list of pupils who keep the following:

<i>Kitchen Garden</i>	<i>Cattle</i>	<i>Poultry</i>	<i>Piggery</i>	<i>Fishery</i>
(i)				
(ii)				
(iii)				
(iv)				
(v)				

2. Visit a dairy farm and observe the different types of cattle. Also see how the cow is milked.
3. Find out the different methods of cleaning teeth.
4. Make a list of food items which are good for teeth and gums.

CHAPTER 3

Soil and Crops



SOIL is everywhere. Some soils are sticky and wet. Some soils are dry. Some are powdery. What is soil made up of?

Let us find out

Get some soil from different places. Mix them and examine. List the different things you find in the soil. There may be small stones, leaves and insects.

Put the soil in a glass vessel. Pour some water. Stir the mixture. Allow it to settle. Observe the way the soil settles. It settles in layers. At the

bottom are the larger particles. In the middle are smaller particles. Next are very small particles. Do you find something floating at the top? This is humus. Find out what the humus contains.

Soils have different colours. Some soils are black. Some are brown. Some are red or yellow. Soils may be of other colours also.



Look at the different samples. Touch and see. Some are rough. Some are smooth. Some are more fine to touch.



Some soils have more of sand particles. This is sandy soil. Some have equal amount of sand and clay. This is loamy soil. When fine particles are more, the soil is called clayey soil. Black soil is generally clayey soil. Yellowish brown soil is loamy soil. White brownish soil is sandy soil. Which soil holds water most?

Let us find out

Take three flower pots. Mark them as 1, 2 and 3. Put each one of them over two bricks as shown in the picture. Take three small pieces of cloth. Spread the cloth pieces at the bottom of each pot. See that the holes are covered. Take equal amounts of sandy, clayey and loamy soil. Put the sandy soil in 1, loamy soil in 2 and clayey soil in 3. Place a container under each pot.



Now pour equal amounts of water in each pot. Collect the water that comes out. Which soil allows most water to pass? Which soil allows the least water to pass?

Humus is an important component of soil. Humus helps the plants to grow. Manures increase the humus in soil. Which soil has more humus?

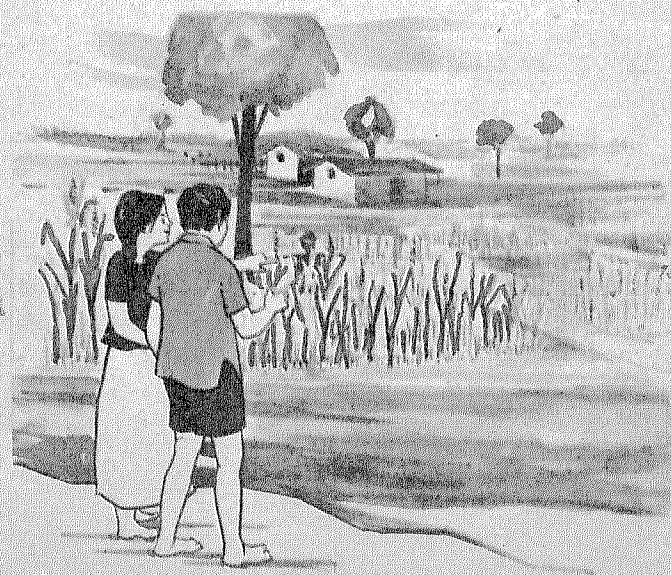
Let us find out

Collect samples of soil from the bank of a river or a canal. Also collect soil from a field, a dry pond and a garden. Put equal amounts of these samples in separate glass vessels. Add equal amounts of water to the vessels and stir. Allow the mixtures to settle. Which soil contains most humus?

You must have observed that wheat and paddy are grown in different types of soil. Paddy grows best in clayey soil. Wheat grows best in loamy soil. What type of soil is required for barley and *bajra*?

All types of crop are not grown at the same time. Each crop also needs a different kind of soil. Which type of crop grows in which type of soil?

Let us find out



Visit a farm. Find out the kinds of crop grown there. Also visit other

farms and fields in your locality. After observation, complete the following table. Take the help of your teachers, parents and farmers.

	<i>Time of Sowing</i>	<i>Time of Harvesting</i>	<i>Type of Soil</i>	<i>Locally grown</i>
Maize				
Barley				
Gram				
Pea				
Arhar				
Groundnut				
Tomato				
Brinjal				
Chilli				
Cauliflower				
Radish				
Carrot				
Bean				
Cucumber				
Palak				
Mustard				



You know now that soil contains large, small and very small particles. Where do they come from? They come from rocks. How do we get soil from rocks?

Let us find out

Take two pieces of rock. . Rub them together. Collect what falls from the rocks. Examine the rubbed surface. Observe the powder with a hand lens. Do you find very fine particles?

In nature, soil is formed by the action of the sun, wind and water.

How many types of rocks are there?

Let us discuss

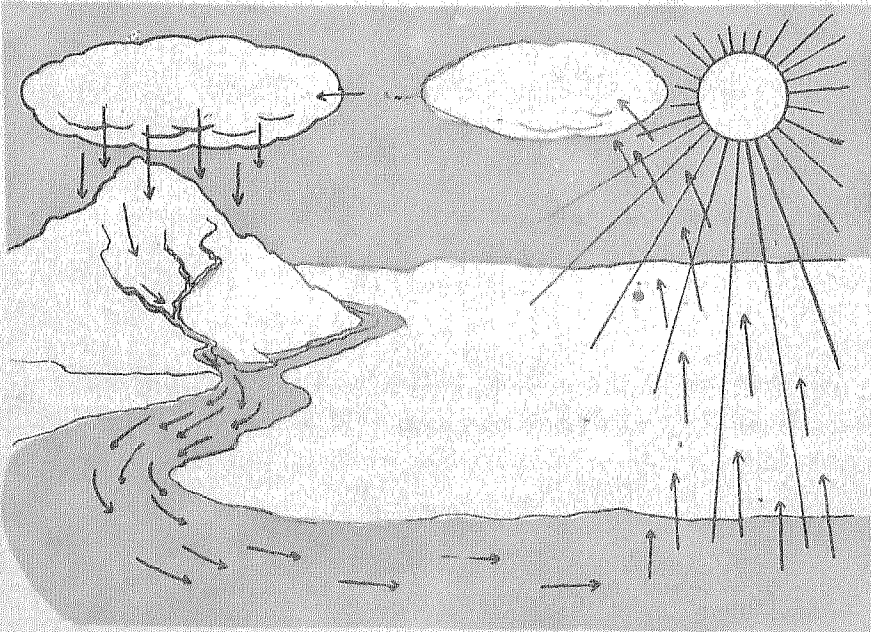
Collect as many types of rocks as you can. Classify the rocks according to colour and hardness. Some rocks are hard. Some are soft. Some are smooth. Some are rough.

Things to do

1. Find out how dead animals and leaves become part of the soil. Write the activity in detail.
2. Collect different types of rocks from your locality. Classify them on the basis of colour, size, shape and hardness. Can you classify them in any other way? Mention the basis of classification. Write ten sentences about each rock.
3. Make mud strips of soils. Let them dry up. Do they set hard? What type of soil is it – sandy, clayey or loamy?

CHAPTER 4

Weather



SOMETIMES it is cool and pleasant early in the morning. It gets hot at noon. At other times it rains in the morning, but becomes sunny at noon. We often say it is very cold today, or it is very hot. Actually we are describing the weather. How does the weather change? We have often seen rain. How does it rain?

Rain comes from the clouds. How are clouds formed?

Let us find out

Take some water. Spill it on the *pukka* ground. Leave it for some time. What happens to the water? Does it remain on the ground? Does it disappear? Where does it go?

Take a piece of wet cloth. Spread it out. Soon the cloth dries up. What happens to the water?



All this water changes into water-vapour and goes into the air. Water-vapour from lakes, rivers, ponds and streams also go into the air. This water vapour forms clouds. We get rain from clouds. Water from the earth goes into the air. From the clouds the water again comes back to the earth. This is called the water-cycle.

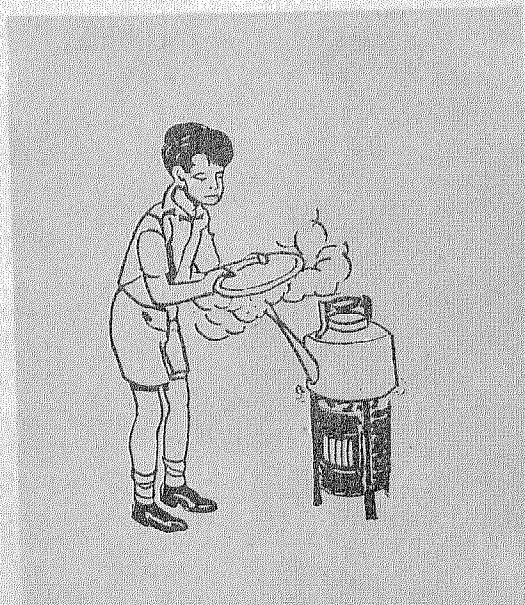
The picture in the beginning of this chapter shows how water goes into the air and how it comes back to earth. How can we study the water-cycle in the class?

Let us find out

Take a metal pot. Put water in it. Heat it for some time. Observe what comes out of the mouth of the pot. Do you know it? Now take a plate. Wipe it dry. Place it above the steam. Now remove the plate. Observe it. You will find droplets of water falling down from the plate.

What did you do? You changed the water into steam and then changed the steam into water. Steam is a form of water. In some parts of our country like Simla, we get snow. The snow melts into water. If you keep water in a very cold place it becomes solid. It is called ice. Ice is, therefore, a form of water.

Ice is a solid. Water is a liquid. Steam is a gas. These are different



forms of water. What happens to ice when it melts?

Let us find out

Take a piece of ice. Touch it. How do you feel? Now put it in a glass



vessel. Wipe the outer surface of the vessel. Observe it until the ice melts. Record your observations. What happens to the ice? What happens to the outer surface of the glass vessel?

Water deposits on the outer surface. Where does this water come from? This is from the air. Where does water-vapour in the air come from? The water from seas, rivers, ponds, lakes and other places goes into the air as water-vapour. The sun heats water and changes it into water-vapour. How does the sun bring about this change?

Let us find out

Take two vessels of the same shape. Put equal amounts of water in each. Mark the level of water with the help of a paper strip. Place one of them in the sun. Place the other in shade. Leave it for some time. Observe what happens to the water level. Which of the vessels has lost more water?

Wind also helps to change water into water-vapour. How does it happen? We know that clothes dry quickly on a windy day.



You know that water-vapour goes into the air. It forms clouds. It causes rain. When it rains, the water comes back to the earth. It collects in rivers, lakes and ponds.

Let us discuss

Watch the ground after the rain. The ground soaks some water. Part of the water goes up into the air as water-vapour. Some of the water from the land may go into streams. Streams form rivers. Rivers flow into a sea. Where does water go from the sea?

The water-cycle affects weather. Weather changes all through the year. It also changes during a day. How do we know?

Let us find out

Observe the change in weather during a day. Write down your observations in the table below:

<i>Timings</i>	<i>Hot or Cold</i>	<i>Windy or Calm</i>	<i>Cloudy or Clear</i>	<i>Rainy or Sunny</i>
Morning				
Noon				
Evening				
Night				

Weather may also change from day to day. Observe the changes in weather for a week. Write down your observations in a table like the above one.

Which type of weather was most common during the week? Can you find out from the table which day was the coldest? Which day was the

hottest? Which day was rainy? The weather also changes during the year. Try to observe changes in the weather throughout the year.

Weather affects all of us. Do we use the same kind of clothes all the year round?

Let us discuss

Recall the kind of clothes you wear during summer, winter and the rainy season. Why do we use warm clothes during winter? Why do we use light clothes in summer?

A knowledge of weather is useful to us in many ways. It helps the fishermen, farmers, pilots and navigators in their work. Do you know how?



Farmers must know about weather for sowing and harvesting crops. When the weather is stormy and foggy, it is dangerous to fly an aeroplane.

We can know about the weather in advance. This is called weather forecasting. The weather forecast is given in daily newspapers. The radio also gives information about weather. How can we get information about weather?

Let us find out

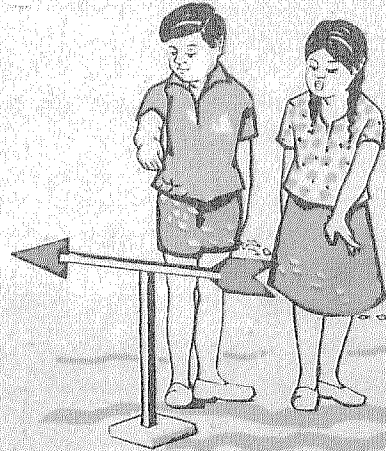
Request your teacher to get the weather forecast for the day. Record it in your note-book. Observe the weather throughout the day. Compare it with the forecast. Do you find any difference?

Sometimes weather changes suddenly. You should protect yourself against a sudden change of weather. You must listen to your parents' advice.

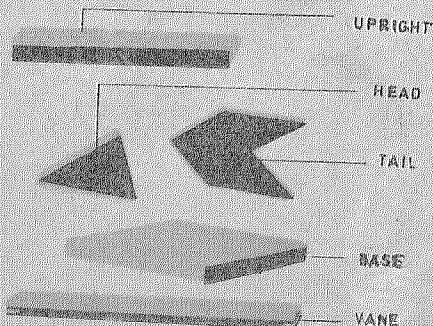
Things to do

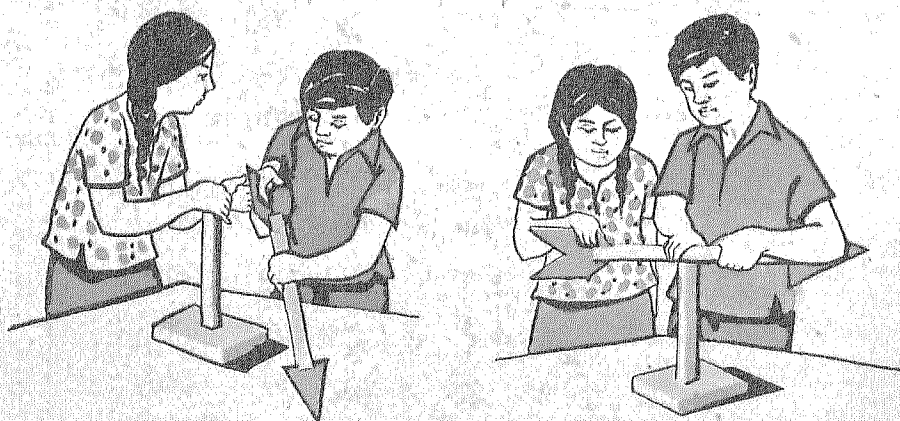
1. Find the direction of the wind in the following ways:

- (a) Take very small pieces of paper. Let them fall from your hand. Do they fall straight? Do they fall in any one direction? Note the direction. Can you tell the direction of the wind?



- (b) You can also make a wind-vane. Your teacher will help you to make one. The picture here shows how to make a wind-





vane. The arrow of the wind-vane points to the direction of the wind.

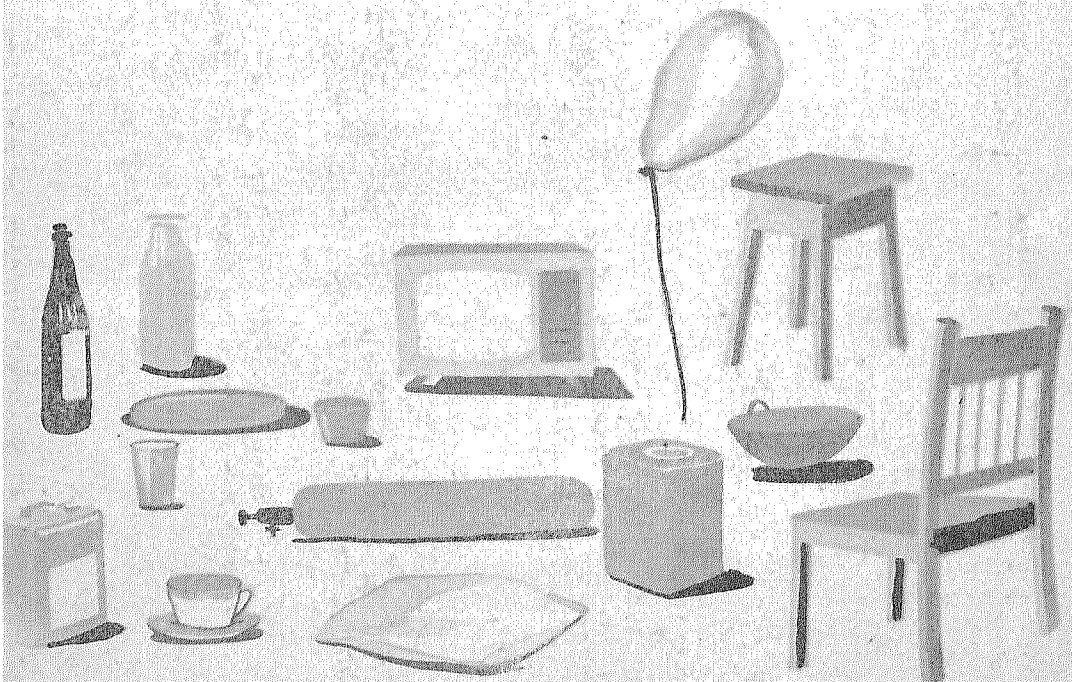
2. Collect weather forecasts for a week from old newspapers. Record the forecasts in the table below:

<i>Day</i>	<i>Minimum Temperature</i>	<i>Maximum Temperature</i>	<i>Sunny or Cloudy</i>	<i>Amount of Rainfall</i>

3. Plan an activity to show that it is cooler in the shade than in the sun.
4. Make a chart showing the water-cycle.

CHAPTER 5

Materials Around Us



LET us collect as many things as we can. Some of these are shown in the picture. Are they all made up of the same material? Put them in three groups. Which of them are like stone? Which are like water? Which are like air?

Let us classify

Group the materials as follows:

<i>Materials like stone</i>	<i>Materials like water</i>	<i>Materials like air</i>
1 2	1 2	1 2

<i>Materials like stone</i>	<i>Materials like water</i>	<i>Materials like air</i>
3	3	3
4	4	4
5	5	5
6	6	6
Material like stone is called <i>solid</i>	Material like water is called <i>liquid</i>	Material like air is called <i>gas</i>

Do all these things have definite shape?

Let us find out

Take a solid material, like a stone. Put it on a plate. Does the shape change? Now put it on the table. Then put into a tumbler. Do we find any change in its shape?

A stone has a definite shape. Repeat this activity with marble and wood pieces, iron nails and other solids. Do these solids have a definite shape? Solids have a definite shape.

What happens if we put materials like water in different containers?



Let us find out

Take some water. Put it on a plate. What is the shape of water now? Pour the same water into a tumbler. What is the shape now?

Pour equal amounts of water into vessels of different shapes. Do you see any changes in the shape?

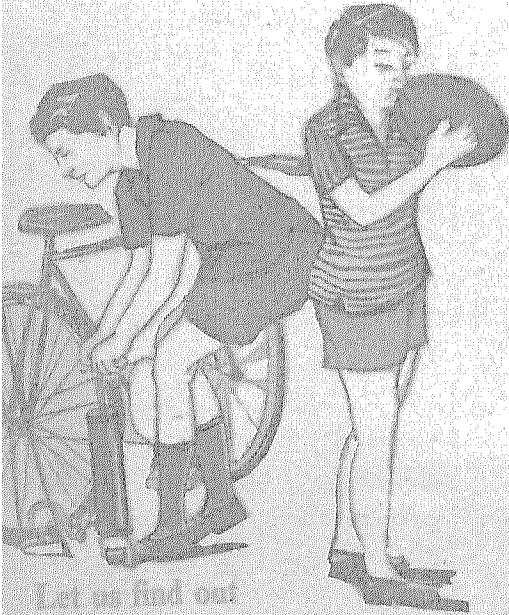
Water takes the shape of the vessel. Repeat this activity with oil, milk, butter-milk or any other liquid. All liquids take the shape of the vessel.



Does a liquid take up the whole space of a vessel?

Let us find out

Take a cup full of water. Pour it into a long tumbler. Does the water fill the tumbler? No. The water occupies limited space. All liquids take up only limited space. Do materials like air have a definite shape?



In the picture a boy is blowing air into a football bladder. There is another boy pumping air into a cycle tube. Air takes the shape of the bladder or tube. It has no shape of its own. Does it take up limited space?

Air is a gas. It is around us. How do you know? When you run, you feel air striking against you. Even empty vessels contain air. How do we know?

Let us find out

Take an empty vessel. Try to dip the vessel upside down into water. What do you observe? The moment the vessel is tilted, air bubbles come out. Where do they come from? We cannot see air. We can feel it. Air also occupies space. How do we know?

Let us find out

Take a long glass tumbler. Take also a piece of paper. Put it into the tumbler. Press it to the bottom. Carefully turn the tumbler upside down. Now slowly dip the tumbler into water. Does water enter into



the tumbler? Does it completely fill the tumbler? What happens to the paper?

Lift the vessel out of water. Hold it as such. Observe the paper. Why does it remain dry? The air inside the tumbler keeps the paper dry. It does not allow the water to get in.

Can you name any gas other than air? Nowadays in our villages *gobar* gas is used. Have you seen a *gobar* gas plant? How do we get gas from *gobar*?

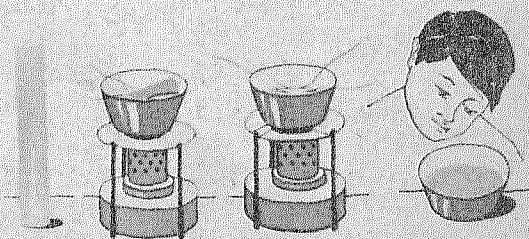
Request your teacher to take you to a *gobar* gas plant. He will explain to you how gas is prepared in the plant. In case there is no *gobar* gas plant near by, he will himself prepare the gas by mixing equal amounts of *gobar* and water in a vessel, closing the mouth of the vessel and leaving it for about a week. You can test the gas by burning. The used *gobar* is not a waste. It can be used as a manure.

You are familiar with ice, water and water-vapour. These are three forms of the same material. Ice is a solid. Water is a liquid. Water-vapour is a gas. We can get water from ice. We can get water from water-vapour also. One form can be changed into another form. Like water, do other materials also have different forms?

Let us find out

Take candle wax. It is hard. It is difficult to change its shape easily. We cannot change its shape by pressing it with our fingers. Heat it. It melts. It becomes liquid. Leave it for some time. It again becomes solid. On heating, solid wax changes into liquid wax. On cooling, liquid wax changes into solid wax.

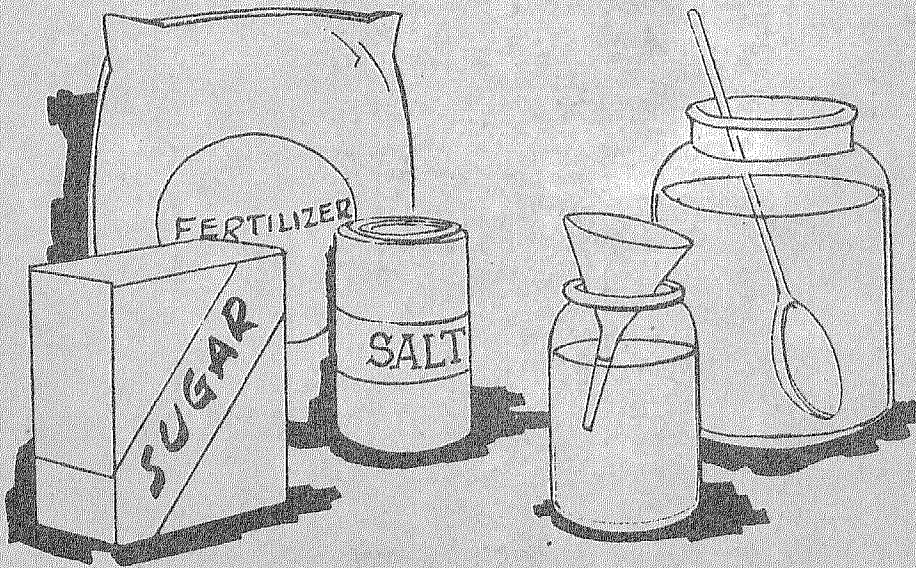
Ghee, coconut oil, and many solids change into liquids on heating. In winter, ghee and coconut oil are in solid form but in summer these are in liquid form.



Water dissolves many things. How many things are dissolved in water?

Let us find out

Put salt, gur, sugar, soap, fertilizers, chalkdust, flour, metals, stones and kerosene each in water. Find out which things dissolve in water. Group them as follows:



<i>Things which dissolve in water</i>	<i>Things which do not dissolve in water</i>
1. 2. 3. 4. 5.	

Some materials dissolve quickly in water. Others take more time. How can we dissolve things quickly?

Let us find out

Take a glass bottle. Fill half of it with water. Add big pieces of salt. Stir the water. Let the salt dissolve. Note the time. Take another

big piece of salt. Powder it. Dissolve it in water. Again note the time. Which one takes less time? Go on adding salt. Stop adding when no more salt dissolves. Filter the solution. How can you get back the salt from this solution? Will hot water dissolve more salt than cold water?

Let us find out

Take a metal pot. Fill half of it with water. Add some salt and stir. Keep on adding salt until a little salt remains at the bottom. The water will dissolve no more salt. Now gently heat the pot. Stir the water at the same time. Now add a little more salt. See what happens. See how much more salt can be dissolved.

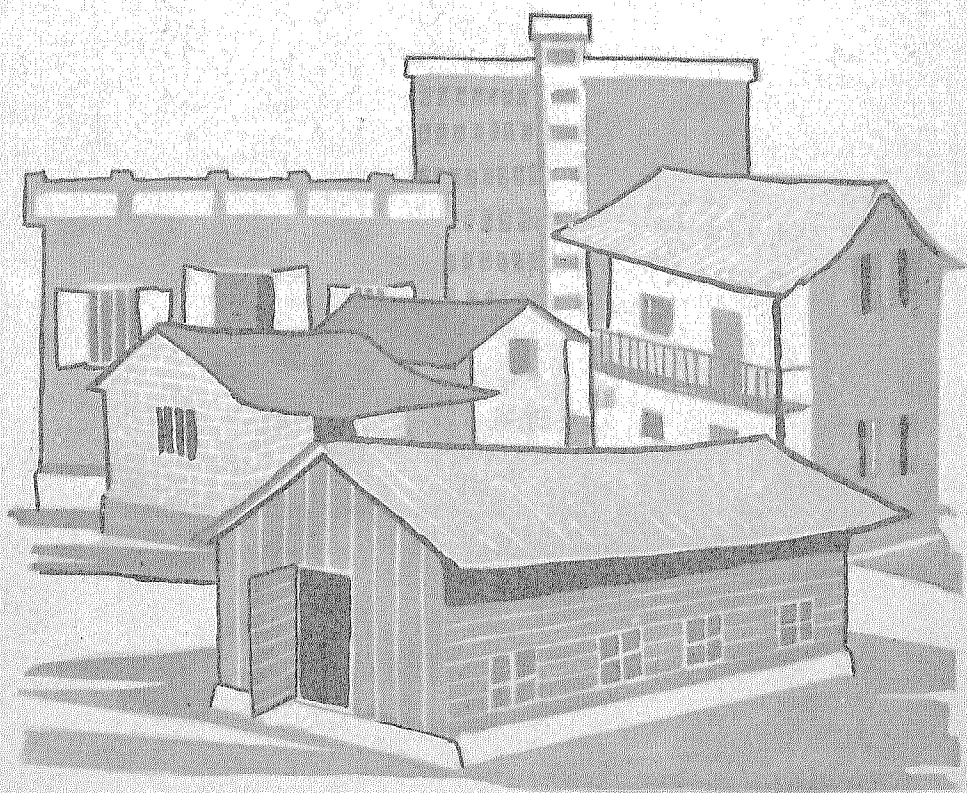
Things to do

1. Collect as many materials as you can. Classify the collected materials according to:
 - (a) Colour
 - (b) Hardness or softness
 - (c) Roughness or smoothness
 - (d) Smell or lack of smell
 - (e) Whether they sink in water or do not sink in water
 - (f) Any other ways.
2. 'Kerosene oil dissolves grease-wax and coal-tar.' How will you find out if this is true? Write down the steps you will take to find this out. Try to find other materials which are dissolved in kerosene oil.
3. Interview a goldsmith of your locality. Find out from him what liquid he uses for cleaning gold and silver ornaments. (Gold and silver dissolve in a mixture of acids. Street-vendors clean ornaments by dissolving them in this acid mixture. Dirt is removed but some of the metal is also dissolved.)



CHAPTER 6

Housing and Clothing



THERE are many houses in your locality. They are not alike. In fact, no two houses are exactly alike. Let us learn about them.

Group yourselves into five or six batches. Select a part of your locality. Find out the number of houses in the locality. How many are *kacheha* houses? How many are *pukka* houses? What are the different kinds of materials used for building houses? What is the most common material? Try to find out why some materials are used and not others. Record your observations in the table below:

cord your observations in the table below :

<i>Types of Kachcha</i>	<i>houses Pukka</i>	<i>Open space around the house</i>	<i>Materials used</i>			<i>Types of roof</i>	<i>Windows</i>
			<i>Roof</i>	<i>Wall</i>	<i>Floor</i>		

All houses should be kept clean. What are the things essential for a clean and healthy house?

Think of your house. If possible, draw the outline of your house. Try to answer the following questions:

1. How many rooms are there in the house?
2. Do the rooms have doors and windows? How many doors and windows are there?
3. What are the positions of the doors and windows?
4. Is there a separate place for cooking?
5. Is there a separate place for taking a bath?
6. Is there a water-tap in the house? If not, how do you get drinking-water?
7. Are there urinals and latrines in the house? If not, where do the family members urinate or defecate?
8. Do you have domestic animals in the house? Where are they kept?
9. Is there a *pukka* drain in the house? If not, what happens to the waste water?

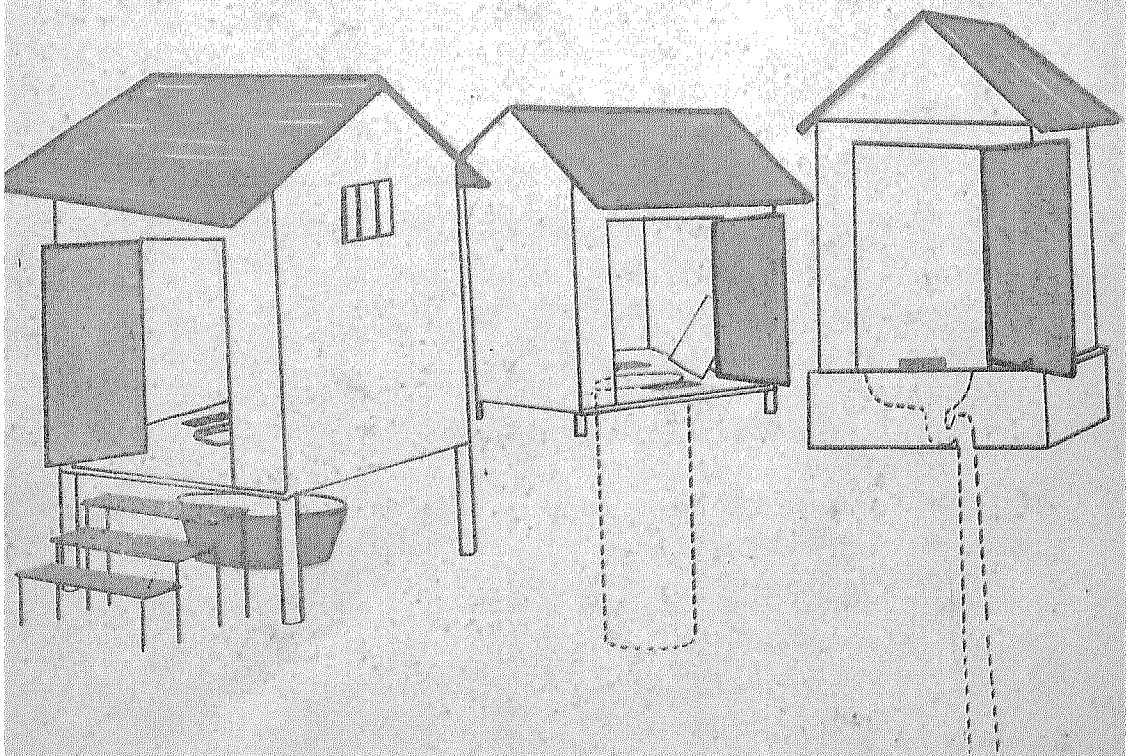
Can you now list out the essential things in a good house? How can you make your house hygienic?

Let us discuss.

Keep your house clean. How can you keep the mud floor clean? How can you clean the cement floor? Why do we dust the furniture and other household goods? Keep the garbage from the house in a covered container. What happens to the garbage that is left open?

A house should have enough sunlight and air. In what way do doors and windows help us? How can you get enough sunlight and air into the house?

How do you get rid of dirty water? Drains carry away dirty water. If



there is no drain in the house, dig a *kachcha nala*. The dirty water will flow out from the house through the *nala*. If you have a kitchen garden,

you may use this water for plants. Do not allow any water to remain stagnant in the house or near it. Do you know why? Mosquitoes breed in such stagnant water.

Some of you may not have a latrine in your house. Where do you urinate and defecate? Maybe in the open field. It is very harmful to urinate and defecate in the open places. Do you know why?

Let us discuss

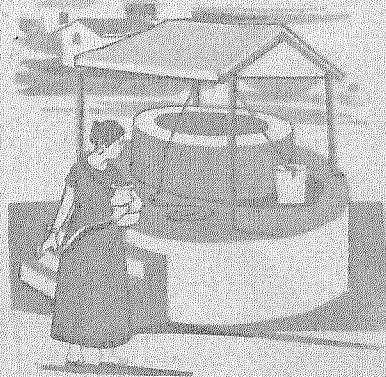
Uncovered stool attracts flies. The same flies sit on food materials. They carry the germs of diseases from stool to food. A person who eats such food may fall ill. The stool may spread germs of diseases in other ways. When it remains uncovered, it slowly dries up. It then turns into fine particles. These particles mingle with air. Thus the air becomes polluted.

After defecation the stool must be covered with dust or mud. But it is better to build a latrine. We can build a pit latrine or a trench latrine as shown in the pictures. A number of families can get together to build a latrine. This can be shared by them all. Try to find out the different types of latrines used in your locality. Whatever the type of latrine you use, keep it clean.

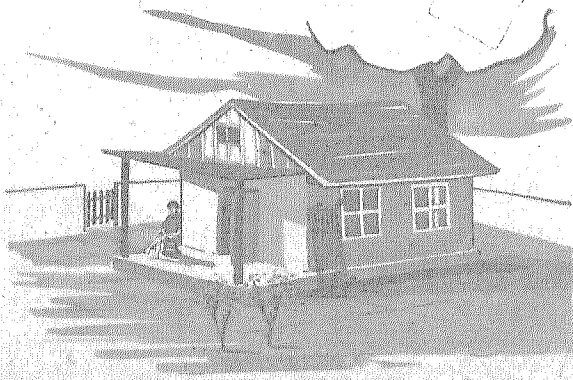
Clean, safe drinking-water is essential for health. How do you get drinking water in your house? Some of you have tap water. Others get water from the well. How can you protect the source of drinking-water?

Let us find out

Visit a well. Observe the surroundings of the well. Is there any stagnant water around? Is there any latrine near by? Are the bucket and the rope clean? See that the rope and the bucket are kept clean. Also make sure that dirty water does not stagnate around the well. What happens if dirty water is allowed to seep into the well? What are the other ways by which the water of the well gets dirty?



Here is a picture of a clean, tidy house. But observe the surroundings.



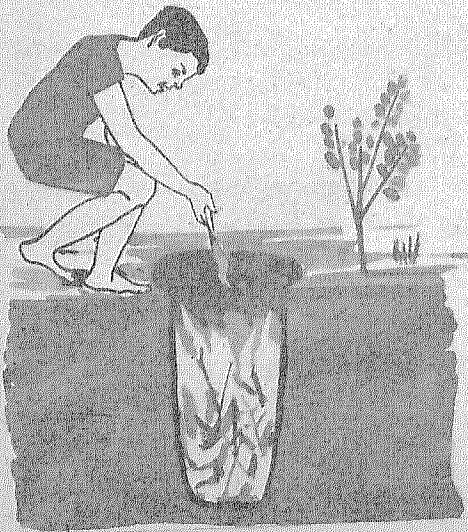
Is it good for health? What can we do about it?

Let us find out.

Make a survey of your locality. Find out how the garbage is disposed of. You will often find that garbage is thrown outside the house. This is harmful to health. Houseflies and mosquitoes breed in such places. Diseases spread easily in such unhealthy surroundings. The garbage also makes the surroundings dirty and ugly. The garbage should be collected in a can, which should be covered. How can we dispose off garbage properly?

Let us find out.

Dig a deep pit at a proper place and put the garbage into it. Cover it with soil. It will make your surroundings clean. The garbage will decompose in the pit. It can be used as manure.



You should keep your house clean. You should also keep your surroundings clean. A nice, clean small house is better than a big dirty house. A house can also be made beautiful by decoration. Potted plants and wall hangings make a house beautiful and pleasant to live in.

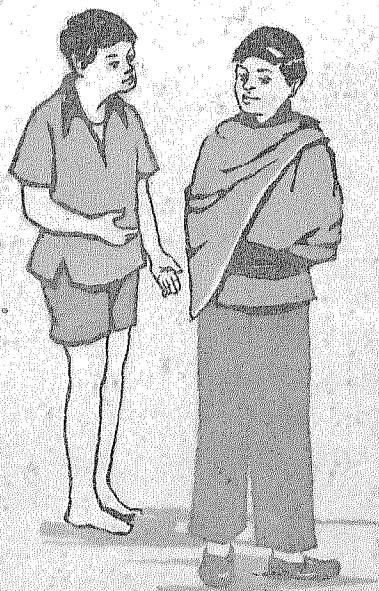
A house gives us shelter. It also makes living comfortable. Like shelter, clothes are also essential. Why do we need to wear clothes?

Let us find out

Make a list of the clothes you are wearing. List the clothes you wear in summer. List the clothes you wear in winter. Why do you use different kinds of clothes in different seasons?

In winter, warm clothes protect us from cold. In summer, light and loose clothes are comfortable. You should always wear clean clothes. Why? Clothes should also be loose. Why? Have you ever tried to wear tight clothes? What happens? Can you breathe properly? Can you move properly? Do you know why you feel uncomfortable in tight clothes?

The clothes you wear should be clean. Warm water and soap are best for cleaning clothes. Are there any other ways of cleaning clothes?



Let us find out

Observe people washing clothes. List the things used for cleaning. Find out which is the best method of cleaning clothes.

You should always keep your clothes clean and tidy. You should wash your underwear every day. Do not wear clothes of other people. If you have to, wash them before wearing. Do you know why?

We must all remember that a clean house, clean surroundings and clean clothes are good for health. One may be poor or rich but one who remains clean remains healthy.

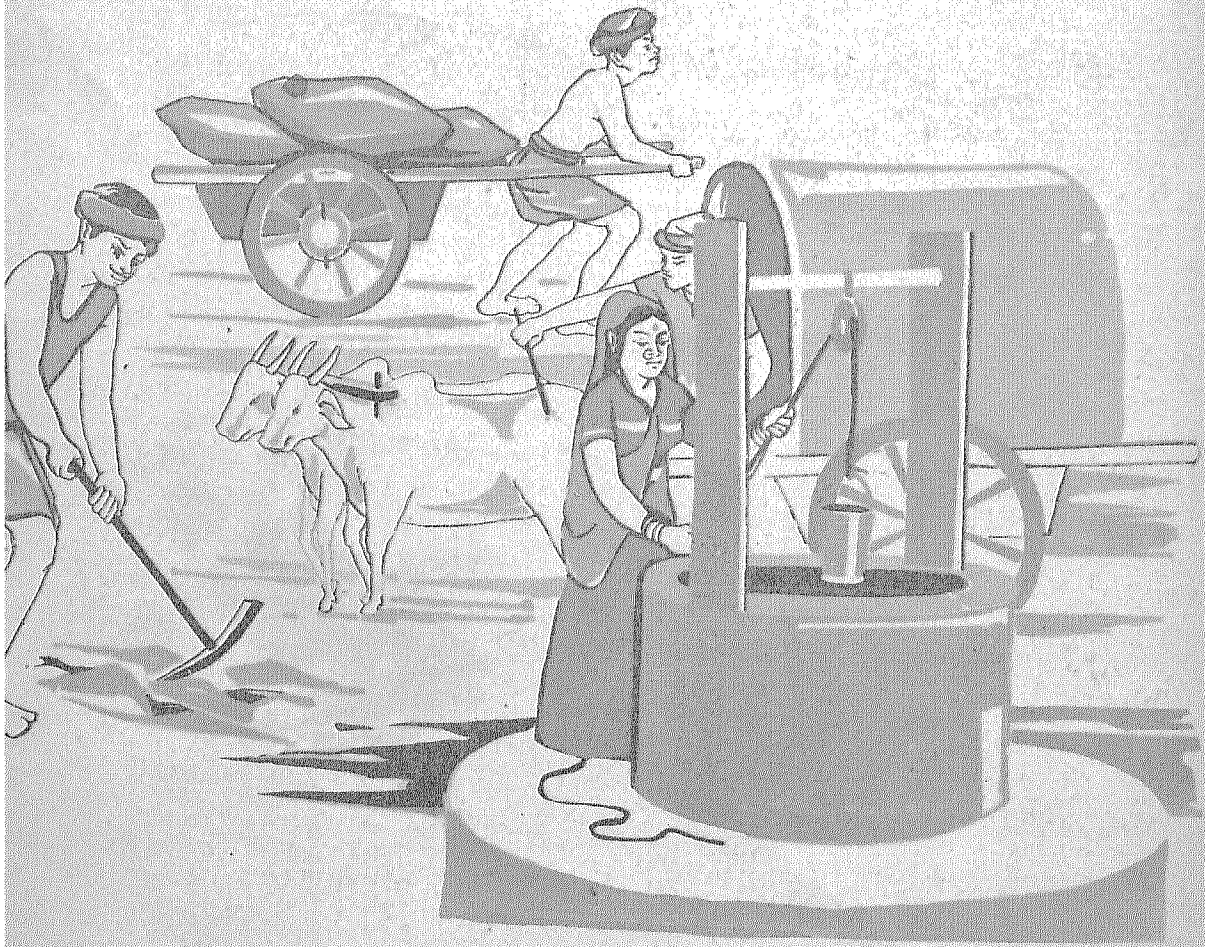
Things to do

1. Find out the different types of houses in your locality. How are these suited to the climate? What are the local building materials used?
2. Make a survey. Find out how many houses have *pukka* drains. How many houses have a *kachcha nala*? What precautions are taken to prevent the breeding of mosquitoes?

3. Interview the local panchayat or municipal authority. Find out what sanitary measures are taken by them to keep the locality clean.
4. Organise a cleaning campaign under the guidance of your teacher.

CHAPTER 7

What Makes Things Move



WE see many things moving. A cart moves, a horse runs, a bird flies. We also see moving things stop. What makes a thing move? What makes it stop?



Let us find out

Take a brick. Lift it with your hand. Feel what happens to the muscles of your hand and arm. Observe the muscles. Let a friend of yours feel the muscles. The muscles become quite hard. The force exerted by the muscles of the hands and legs is called muscular force.

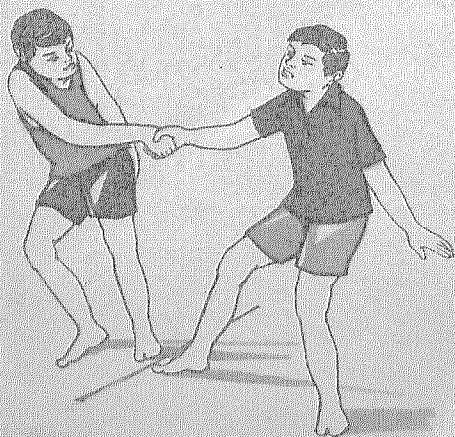
Some forces are small and some are large. What are small and large forces?



Let us find out

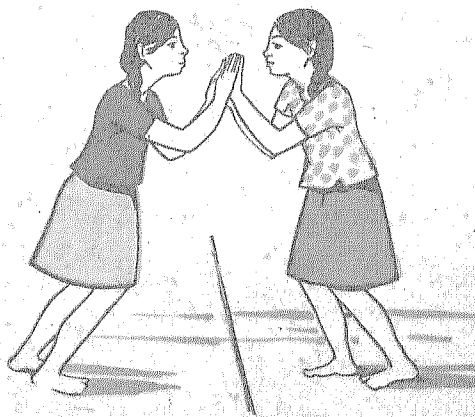
Take a piece of chalk or some slaked lime. Draw a line on the ground. Ask one of your friends to stand on one side of the line. You stand on the other side. Now try to pull each other. Who is able to pull the other across the line? You or your friend? Who used more force, the winner or the loser?

In pulling we use force. Do we use force in other ways?



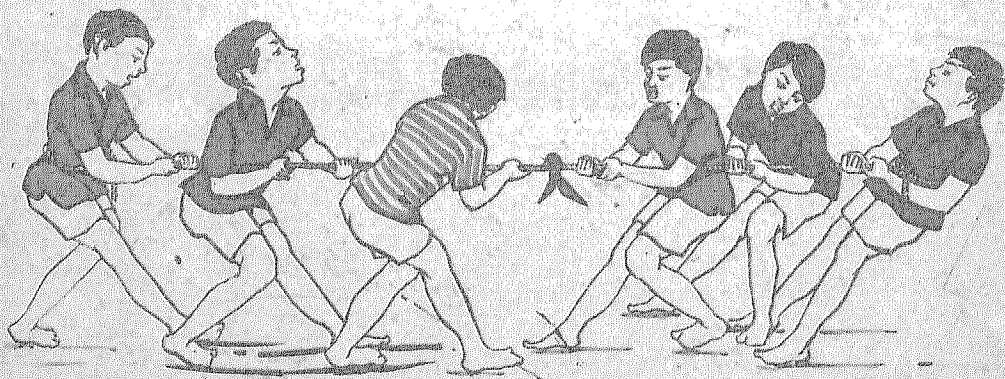
Let us find out

Stand on either side of the line, as before. Now place your hands against each other. Push hard. Who could push into the other side? Who used more force, the winner or the loser? In pushing we use force. Write down different activities where you use force. Sometimes the forces are equal. Sometimes they are unequal. How?



Let us find out

Arrange yourselves in two groups. Each group should have an equal number of children and of matching force. Take a rope and arrange a tug of war. Fix a mark in the middle of the rope.



When forces are equal on both sides, the mark does not move to any side. Let a child from one group join the other group. Again pull the rope. Observe that the mark in the rope moves towards the larger force. Sometimes we need a large force. Tools help us in applying a large force. How do tools help in applying a large force?

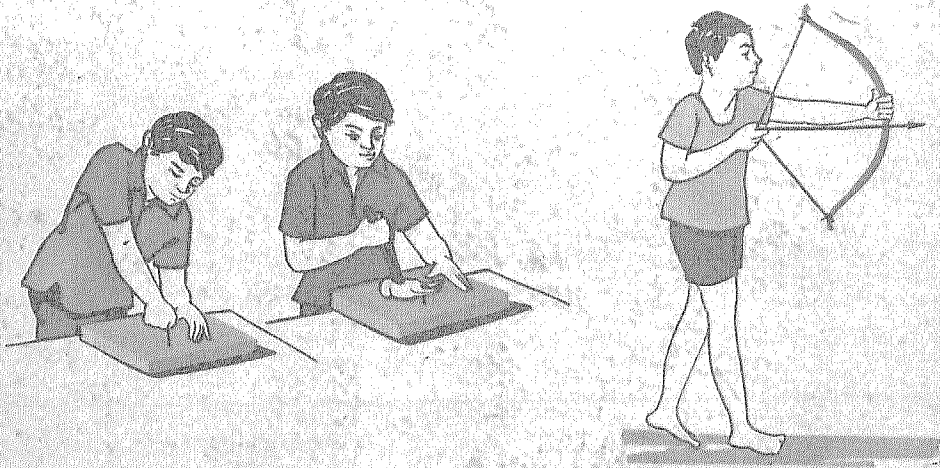
Let us find out

Fix a nail on a wooden board. Try to pull it out with your hand. Is it easy? Now use a plier to pull out the nail. Does it come out easily? The plier helped you in applying force.

We use many kinds of tools for applying force. Knife, scissors, saw

and hammer are some of these. Can you name some other tools?

Bow and arrow, sling and *gofan* are used for exerting force. How?



Let us find out

Take a piece of bamboo strip and a piece of string. Tie the two ends of the bamboo strip with the string. Prepare an arrow. Take it in your hand and throw it. Note the distance travelled by the arrow. Now put the arrow on the bow. Release it. Again note the distance. Do you find any difference? How did the bow help in applying a larger force?

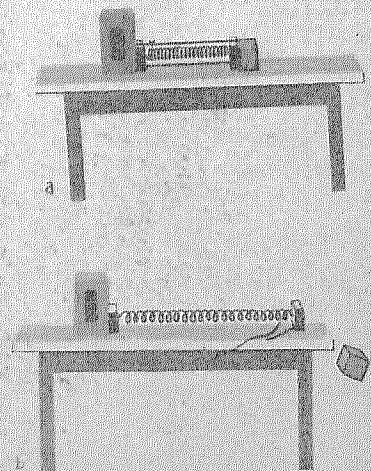
Have you used a sling? How does it exert force?

A spring is also used to exert force. How?

Let us find out

Take a spring. Compress it. Tie a thread over it. Put it on the table. Place a wooden block on one side of the spring and a brick on the other side. Now burn the thread. See what happens? The compressed spring exerts force.

We use a spring balance to measure weight. There are different types of

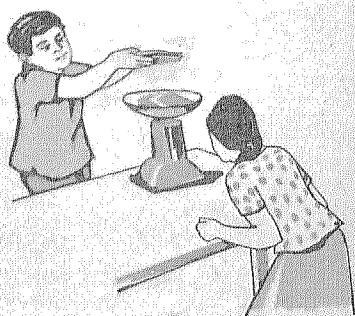


spring balances. How do we measure weight with a spring balance?

Let us find out

Get a top pan balance. Put a set of books on the pan. Find out the weight. Use different objects for weighing. Compare the weights of the objects.

What happens when you let an object fall?



Let us find out

Take a stone. Hold it in front of you. Let it drop. Be careful lest it may hurt you. What happens to the stone? Repeat this with a piece of wood, a nail and some pebbles. Do all these objects fall?

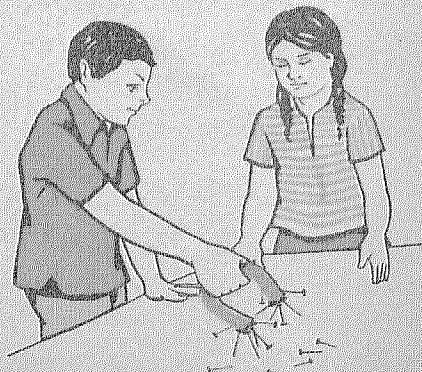
All objects fall to the ground unless they are supported. Do you know why? The earth pulls all objects towards it with a force. This force is called the force of gravity.

The weight of an object is also due to the force of gravity. The force of gravity acts on all bodies.

You now know about the muscular force and the force of gravity. What are the other types of forces?

Let us find out

Get a magnet. Take some iron nails. Bring the magnet near the nails. See what happens. The magnet exerts force in lifting the iron nails. Put some other small objects near the magnet. Find out the objects that the magnet picks up. Record your



observations in the table below:

S. No.	Things picked up by the magnet	Things not picked up by the magnet
1.		
2.		
3.		
4.		
5.		
6.		

The magnet exerts force. This force is called magnetic force.

Have you observed lightning and thunder? On a stormy day you see sparks in the clouds. This is lightning. You also hear a loud noise after the spark. This is thunder. What causes thunder and lightning? This is due to electricity.

Is there a force in electricity?



Let us find out

Take a piece of paper. Tear it into small bits. Take a plastic comb. Hold it near the paper. Does it pick up the bits of paper? Now run the comb through your dry hair. Again bring it near the bits of paper. See what happens. The electric force in the comb picks up the bits of paper.

Force helps to move bodies. Moving bodies also stop. Sometimes you exert a force to stop a moving object. At other times it stops on its own. What stops a moving object?

Let us find out

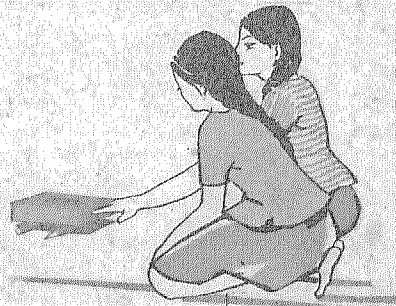
Take a ball. Roll it on a smooth surface. Note the distance travelled by the ball. Now roll it on a rough surface with the same force. Again note the distance. Do you find any difference?

A ball rolls easily on a smooth surface. It rolls with difficulty on a rough surface.

How can you move an object easily?

Let us find out

Take a brick. Put it on a rough surface. Try to push it with one finger. Does it move? Now put the brick on a smooth surface. Push it with the same force. Does it move?

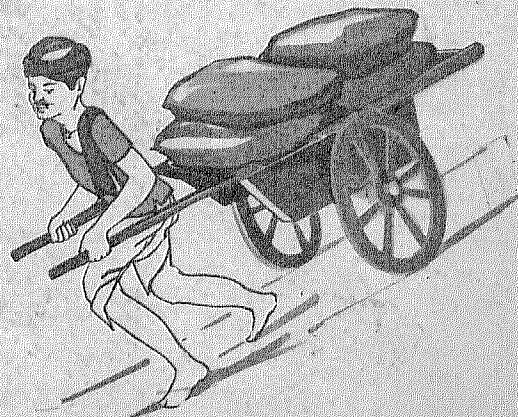


Now take two rounded pencils. Place them below the brick. Try to push the brick. See how easy it is to push the brick. The pencils helped to reduce the friction.

We often use wheels to reduce the friction. How do wheels help to reduce friction?

Let us find out

Try to slide heavy gunny bags. You need to exert a lot of force. Now place the bags on a cart. Try to pull. Do you find any difference? Wheels make it easy to move heavy things. Try to list different ways in which wheels help to move objects.

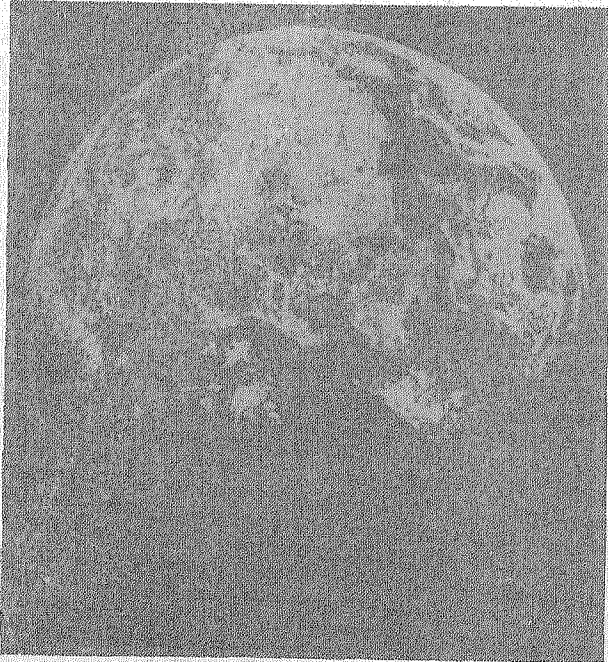


Things to do

1. If you wear terylene clothes, take them off in a dark room. Find out why terylene clothes give off sparks.
2. Carefully examine the wheels of a cart, a cycle, a tractor, etc. Record the differences in shape and size. Note the kind of materials used in the wheels.
3. Try to find out the ways by which surfaces are made smooth or rough. Why do we use oil in wheels and machines?
4. Find out the different devices used for weighing objects.

CHAPTER 8

The Earth and The Sky

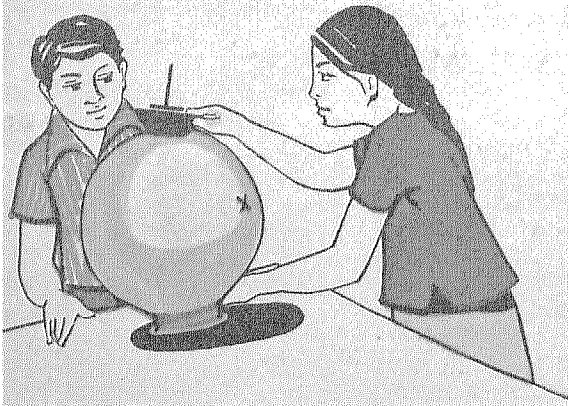


OUR earth is very big. Many villages, towns, countries, rivers, mountains forests and seas are on it. We cannot see the whole earth, even from an aeroplane. What does the earth look like?

Let us discuss

See the picture of the earth given above. It was taken from Apollo-11. The earth looks round like a ball. This picture was taken by the space-men when they were going to the moon. Most of Africa and parts of Europe and Asia can be seen in this picture.

The earth is round like a ball. But to us it seems flat. It looks round when seen from a great height. Is it possible to travel around the earth by moving in a single direction?



Let us find out

Take a *ghara* or a big ball, and a piece of chalk or a toy ship. Mark a cross on the *ghara*. Run the chalk or the 'ship' around the *ghara* in any one direction from the cross. What do you find?

The chalk or the 'ship' goes right round the *ghara*. Just as it can travel around the *ghara*, so can we also travel around the earth.

Look at the picture. Can you say why the child standing at the 2, 3 and 4 positions does not fall down? This is because of gravity. The earth attracts everything towards its centre with a force. This force is known as the force of gravity.

Many explorers have travelled around the earth. They used compasses to find the direction. The compass gives us directions. Can we find out the directions without a compass?

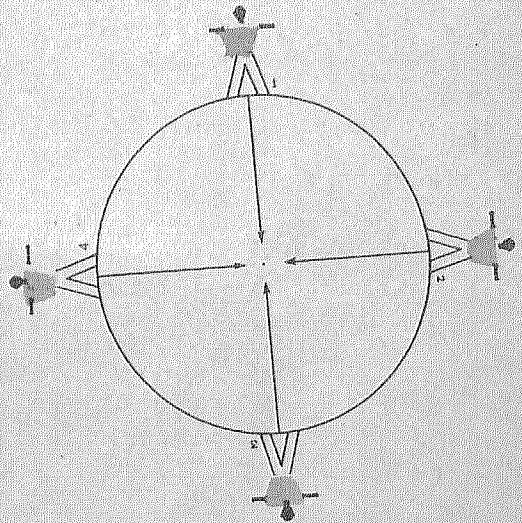
Let us find out

See the sunrise every morning. Locate the direction where the sun rises every day. Also observe the sunset. See the sun setting every evening. Locate the direction where it sets. Observe every day, for a week. Do you find any difference?

The sun rises in the east. It sets in the west. How can we find out the north and the south by the sunrise or sunset?

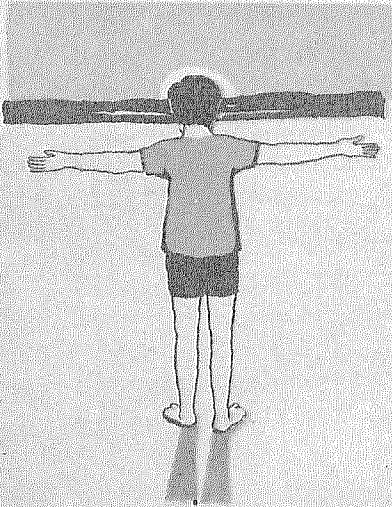
Let us find out

Face the rising sun. Which is the east direction? Which is the west direction? When you face the east, your right hand points to the south.

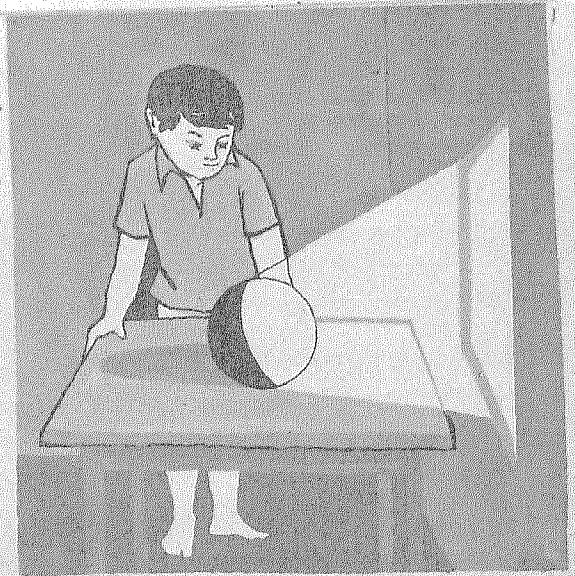


direction. What direction does your left hand point to?

We observe that day follows night and night follows day. How do day and night occur?



Let us find out



Take a ball. Imagine it to be the earth. Place it in front of a slit. The rays of the sun will fall on the ball. Observe the portion on which the light falls. This is day. The portion which does not get light is night. Put a cross mark on the day portion. Now rotate the ball from west to east. What happens to the day portion? What happens to the night portion?

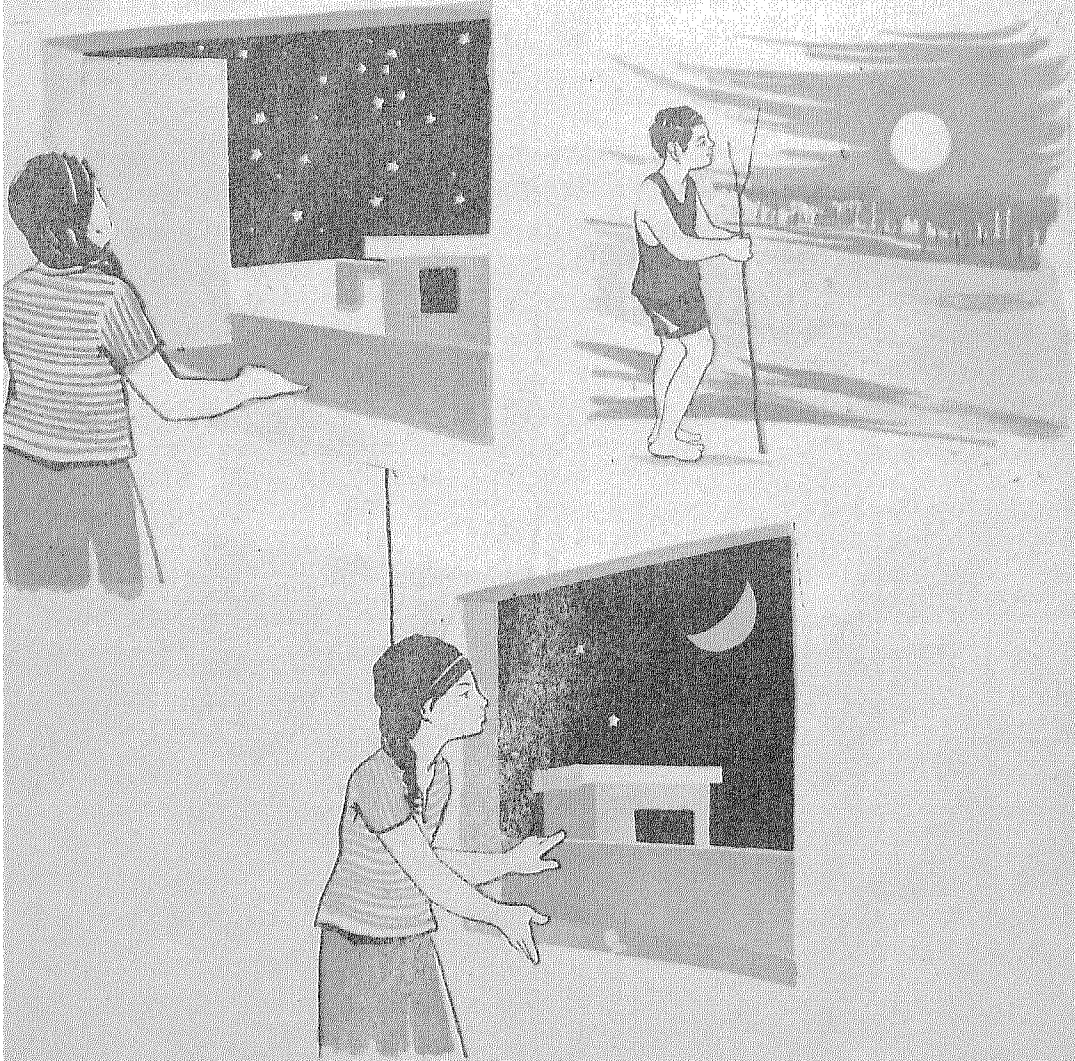
The earth also rotates from west to east, causing day and night. The portion which faces the sun, has day. The portion which does not face the sun, has night.

Now it is daytime. Is it day all over the earth?

Let us find out

Replace the ball in the above picture by a globe. Place it in such a way that India faces the light. Find out the countries which are not getting the sunlight. Which part of the earth has day? Which part of the earth has night? Now slowly rotate the globe from west to east. Which country has night when there is day in India? In case a globe is not available, ask your teacher to help to you prepare one.

The earth makes one rotation in twenty-four hours. Day and night make twenty-four hours. Calculate how many seconds the earth takes to complete one rotation.



When we look at the sky at night we see stars and the moon. During day we see the sun. The sun, the moon and the stars seem very small to us. But they are very, very big. The sun is many, many times bigger than the earth. Why does it look so small?

Let us find out

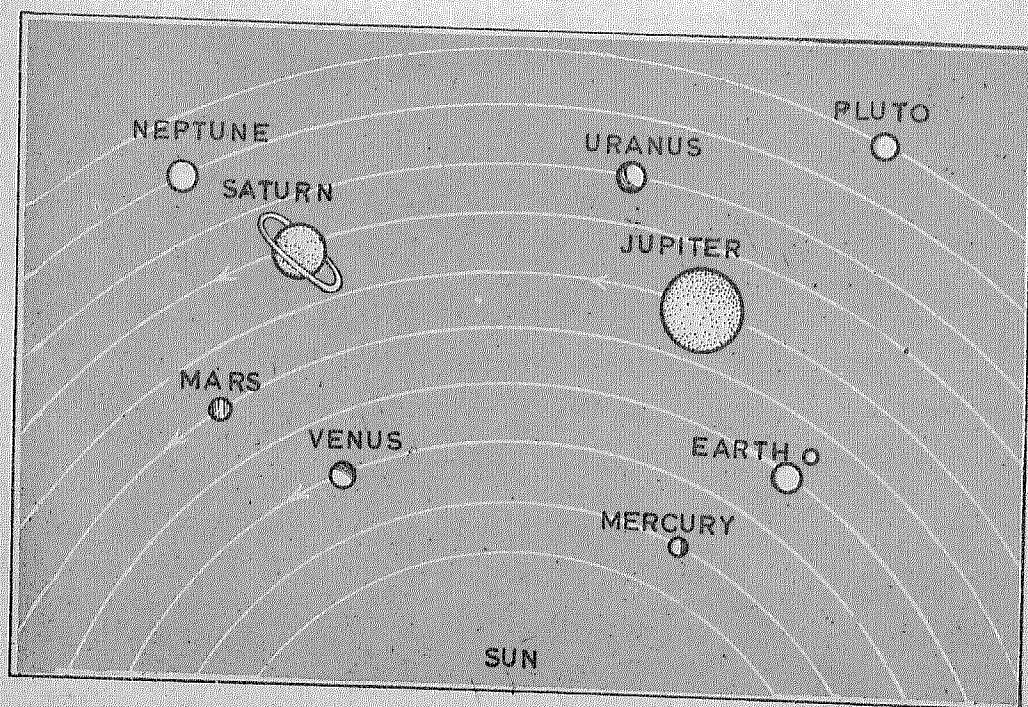
Take a very large *ghara* and a very small *ghara*. Paint these white. Keep

them in the sunlight. Now look at them from a distance of half a kilometre. How do they look?

Climb to the top of a tall building. Take the help of your teacher. Look down at the objects below. Do they look small or big?

Objects look small when seen from a great distance. The moon is nearest to the earth and is much smaller than the sun. But to us, both the sun and the moon seem to be of the same size. The sun is very far. That is why it looks small. Some stars are many times bigger than the sun. They look small because they are far, far away.

The earth and the sun belong to a big family. The picture shows the other members of this family.



We see the sun during the day. At night we see the moon and stars. Does the moon look the same every night? Does it seem to change its shape? Observe the moon for a month.

Start your observation from a full-moon night. Draw the shapes of the moon in your notebook everyday. Record your observation in the table below:

Date	Shape of the moon	
	Visible portion	Non-visible portion

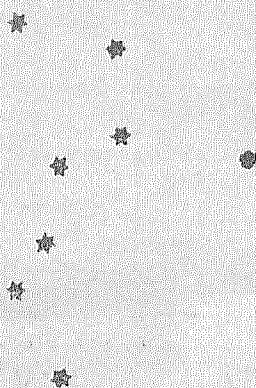
A full-moon night is bright. This is due to the moonlight. Moonlight is very pleasant. The moon gets light from the sun. The bright portion of the moon gets sunlight directly.

Besides the moon, what else do we see in the sky at night? We see stars. The moon appears bigger than the stars. But actually the stars are very big. Many of them are bigger than the sun. The sun is also a star. It is the nearest star. How many stars are there in the sky?

Let us find out

Watch the sky at night. Look at the stars. Try to count them. Can you count all the stars in the sky?

2. Take a big *ghara*, a small *ghara* and place them upside down, a big. Some of the stars are seen grouped together. *Sapta Rishi* is the name of one such group. It has seven stars. Ask your parents to show you *Sapta Rishi*.



Things to do

1. If you get a compass, try to find out different directions with it. Compare these findings with the position of the sun at sunrise or sunset.
2. Take a big *ghara* and a small *ghara* and place them upside down, and also a big ball and a small ball. Take a twenty-five paise coin. Put it first on the small *ghara*, then on the big *ghara*. Next put the same coin first on the small ball then on the big ball. On what does it rest completely? Record your observations. Describe this experiment in your notebook.
3. Locate the different directions by facing the setting sun.
4. Fix a pole in a field. Measure the shadow of the pole at 9:00 a.m., at 12 noon and at 3:00 p.m. Record your observations in the table below.

<i>Time</i>	<i>Length</i>	<i>Direction of shadow</i>	<i>Sun's direction</i>
9:00 a.m.	cm		
12 noon	cm		
3:00 p.m.	cm		

5. Some festivals fall on *Amavasya* and some on *Purnima*. Make a list of these festivals.

